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TRANSACTIONS BETWEEN ADOLESCENTS' SENSE OF RESPONSIBILITY AND
DISCLOSURE TO PARENTS IN THE UNITED STATES AND CHINA:
IMPLICATIONS FOR ACADEMIC ADJUSTMENT

BY

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DISSERTATION

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ABSTRACT

This research examined the transactions between children's sense of responsibility to parents and disclosure to them during early adolescence in the United States and China, with attention to the role of such transactions in children's academic adjustment. Four times over the seventh and eighth grades, 825 adolescents (mean age = 12.73 years) in the United States and China reported on their sense of responsibility to parents and their spontaneous disclosure of everyday activities to them. Information on children's use of self-regulated learning strategies in school was also obtained. In both the United States and China, the more children felt responsible to parents, the more they disclosed to them over time. Children's disclosure in turn contributed to children's enhanced sense of responsibility to parents such that the two transacted over time, mutually maintaining one another over early adolescence. Such transactions appear to be of import for children's academic adjustment, with children's disclosure to parents mediating the effects of their sense of responsibility to parents on their subsequent self-regulated learning strategies.

To my mother

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INTRODUCTION

There is a rapidly growing body of research pointing toward the significance of children's spontaneous disclosure to parents in the adolescent years. Research indicates that during adolescence although parents may obtain information about children's activities in a variety of ways (Waizenhofer, Buchanna, & Jackson-Newsom, 2004; Crouter, Bumpus, Davis, & McHale, 2005), the primary source of parents' knowledge is children's spontaneous disclosure (e.g., Stattin & Kerr, 2000; Keijsers, Branje, VanderValk, & Meeus, 2010). It is now clear that children's disclosure to parents is predictive of enhanced psychological adjustment during adolescence (e.g., Kerr & Stattin, 2000; Stattin & Kerr, 2000), even when their earlier adjustment is taken into account (e.g., Keijsers, Branje, VanderValk, et al., 2010; Laird & Marrero, 2010). Notably, children's disclosure appears to be more important to protecting them against adjustment problems than are parents' active monitoring attempts – for example, parents' solicitation and rule-making: Relative to such attempts, children's disclosure to parents is more strongly associated with their psychological adjustment (e.g., Kerr & Stattin, 2000; Stattin & Kerr, 2000; Keijsers, Branje, VanderValk, et al., 2010).

Given the apparent consequences of children's disclosure to parents, a critical issue is that of what leads children to disclose. Some research suggests that parenting practices may play a role. There is evidence that heightened parental acceptance, responsiveness, and solicitation are associated with heightened child disclosure (e.g., Smetana, Metzger, Gettman & Campione-Barr, 2006; Soenens, Vansteenkiste, Luyckx & Goossens, 2006; Keijsers, Branje, VanderValk, et al., 2010). Other research suggests the importance of children's connectedness to parents: The better the quality of children's

relationships with their parents, the more children disclose to them (e.g., Smetana, et al., 2006; Smetana, Villalobos, Tasopoulos-Chan, Gettman, & Campione-Barr, 2009), with one study suggesting that this pattern is evident among girls, but not boys (Keijsers, Branje, Frijns, Finkenauer, & Meeus, 2010). Given that children's connectedness to parents is multidimensional (Hardway & Fuligni, 2006), an important question that remains is whether dimensions of children's connectedness to parents other than the quality of their relationships play a role in children's disclosure to parents.

One dimension of children's connectedness to parents that is of significance during adolescence is children's sense of responsibility to parents (e.g., Fuligni, Tseng, & Lam, 1999; Fuligni & Zhang, 2004; Pomerantz, Qin, Wang, & Chen, 2011) – that is, children's belief that it is important for them to assist their parents psychologically or materially by, for instance, meeting their parents' expectations for them or helping with chores around the house. Focusing on this dimension, the goals of my dissertation research were two-fold. First, I aimed to understand whether children's sense of responsibility and disclosure to parents transact over time, such that each enhances the other, thereby mutually maintaining one another. Second, I investigated whether the transactions between children's sense of responsibility and disclosure to parents contribute to children's adjustment in the academic arena. In this vein, I focused on whether children's disclosure mediates the link between their sense of responsibility and their use of self-regulated learning strategies identified in prior research (Pomerantz et al., 2011), with attention to whether children's sense of responsibility also mediates the effect of their disclosure (Cheung, Pomerantz, & Dong, in press; Kerr & Stattin, 2000).

Children's Sense of Responsibility

Children's sense of responsibility to parents is likely to take multiple forms. The most studied is their feelings of obligation to their family: Children's belief that they should respect their parents and provide them with support in the present as well as future (e.g., Fuligni & Pederson, 2002; Fuligni et al., 1999). Children's sense of responsibility to parents may also take the form of parent-oriented motivation in school (Pomerantz et al., 2011). Given that school is one of the major arenas in adolescents' lives, many children may see doing well in school as a central way to fulfill their responsibilities to their parents, particularly when parents emphasize the importance of school. The two forms of sense of responsibility are associated, but not to such an extent that they appear to represent a single construct (Pomerantz et al., 2011). Doing well in school may fulfill children's obligations to parents in families in which academics are highly valued, but not in others in which academics are not highly valued. For example, although children's feelings of obligation to their family are mainly fulfilled via academic aspirations and endeavors among children of Chinese decent (Fuligni, Yip, & Tseng, 2002; Fuligni et al., 1999; Hardway & Fuligni, 2006), this is not the case among children of other ethnicities where activities such as helping with housework appear to be primary in fulfilling obligations to their family (Hardway & Fuligni, 2006).

Transactions between Children's Sense of Responsibility and their Disclosure

Children's feelings of obligation to parents and parent-oriented motivation in school may facilitate children's disclosure to their parents over time, as children may see disclosure as part of fulfilling their responsibilities to parents. Children may show respect to their parents by spontaneously telling them about their lives. They may believe that

their parents have the right to know about their life, and thus feel they have a duty to tell parents what they are doing (Smetana et al., 2006). Children with a heightened sense of responsibility to parents may also use disclosure as an opportunity to show their parents that they are responsible. In their conversations with their parents, for instance, they may let parents know about their achievements in school. Even if children are not fulfilling their responsibilities, by disclosing, they may demonstrate to their parents their desire to do better in the future, emphasizing their efforts in this vein.

Children's disclosure to parents may also contribute to their sense of responsibility, such that transactions between the two exist over time. The conversations that ensue from children's disclosure to parents may afford parents the opportunity to provide positive feedback when adolescents have been responsible and negative feedback when they have failed to be; in so doing, parents may communicate what it means for children to be responsible to parents. For example, when children voluntarily tell their parents of the difficulties they have with their schoolwork, parents may take the opportunity to emphasize that being responsible involves heightened efforts to overcome such difficulties. Children may be particularly receptive to such messages given that they initiated the interactions by disclosing. Thus, a transactional process may exist in which children's sense of responsibility to parents fosters their disclosure to them which in turn shapes children's sense of responsibility to their parents over time.

Although there is no direct evidence that children's sense of responsibility to their parents transacts with their disclosure to them, there is some suggestive evidence. In a concurrent study, Yau, Tasopoulos-Chan, and Smetana (2009) found that the more American children of European, Chinese, and Mexican descent felt obligated to their

family, the more they disclosed to parents. Although the trajectories of children's sense of responsibility to parents and disclosure to them have not been examined simultaneously, they appear to be similar during adolescence. Pomerantz and colleagues (2011) demonstrated that children's feelings of obligation to their parents and motivation in school to please them both declined over time in the United States. A similar downward trajectory for children's disclosure to parents during the early adolescent years also exists (Cheung et al., in press; Keijsers, Frijns, et al., 2010; Masche, 2010). Moreover, another form of connectedness between children and their parents – that is, the quality of children's relationships with their parents – is reciprocally related over time to children's withholding information from their parents – what has been referred to as secrecy – among adolescent girls, albeit not boys (Keijsers, Branje, Frijns, et al., 2010).

Implications of the Transactions between Children's Sense of Responsibility and Disclosure for their Academic Adjustment

Understanding the role of children's sense of responsibility to parents in their willingness to disclose to them is of import not only in its own right, but also because it may provide insight into why children's sense of responsibility is predictive of their enhanced academic adjustment. There is sizeable evidence that the greater children's sense of responsibility to parents, the better their academic adjustment. Studying children's feelings of obligation to their family during the high school years, Fuligni and colleagues find that the more children feel obligated to their family, the more they value school (Fuligni et al., 1999; Fuligni & Zhang, 2004) and spend time on their schoolwork (Fuligni et al., 2002; Hardway & Fuligni, 2006) – a finding that does not appear to be dependent on children's ethnic heritage. Children's sense of responsibility – as manifest

in their feelings of obligation to parents and parent-oriented motivation in school – is also predictive of children’s enhanced academic adjustment over time along multiple dimensions such as self-regulated learning strategies and achievement in the United States and China. These apparent benefits of children’s sense of responsibility to their parents hold up even when taking children’s earlier academic adjustment as well as the quality of their relationships with parents into account (Pomerantz et al., 2011). It has been argued that because children often lose interest in school as they move into adolescence (for a review, see Wigfield, Eccles, Schiefele, Roeser, & Davis-Kean, 2006), children’s sense of responsibility to parents may promote enhanced academic adjustment during this phase of development by orienting them toward their parents’ values which may often include doing well in school (Fuligni & Flook, 2005; Pomerantz et al., 2011).

Children’s sense of responsibility to their parents may also enhance their academic adjustment because it leads children to disclose to their parents. Several investigators suggest that because children’s spontaneous disclosure to parents is the main source of parents’ knowledge about children’s activities during adolescence, it may open the door for parents to support children, thereby enhancing children’s adjustment (e.g., Stattin & Kerr, 2000; Kerr & Stattin, 2000; Soenens et al., 2006). Applying this idea to the academic arena, Cheung and colleagues (in press) maintain that children’s disclosure provides an important context for parents to gain knowledge in particular about children’s school life; this may allow parents to provide children with assistance (e.g., explain strategies for solving a problem or purchase materials to facilitate understanding of a topic), which enhances children’s academic adjustment. Consistent with this line of reasoning, in their initial concurrent work on children’s disclosure to

parents in Sweden, Kerr and Stattin (2000) found that the more children disclosed to their parents, the fewer school problems they had (e.g., negative attitudes towards school and problem behaviors in school) and the more positive their relations were with teachers during adolescence. Significantly, children's disclosure to parents is predictive of children's heightened valuing of their schoolwork, time spent on it, use of self-regulated learning strategies, and grades over time during adolescence in both the United States and China, adjusting for children's earlier academic adjustment; these relations remain even when the quality of children's relationships with their parents is taken into account (Cheung et al., in press). Thus, it is quite possible that children's disclosure to parents mediates – at least in part – the effects of children's sense of responsibility to their parents on their academic adjustment.

The transactions between children's sense of responsibility to parents and their disclosure to them may also shed light on why children's disclosure may enhance their academic adjustment. Little research to date has attempted to unpack the mechanisms by which children's disclosure contributes to their psychological adjustment. Some investigators suggest that disclosing one's personal experiences to others has a direct effect on psychological adjustment (e.g., Buhrmester & Prager, 1995; Pennebaker, Zech, & Rime, 2001), presumably because the act of disclosing is less effortful or emotionally stressful, relative to the act of concealing information (e.g., Frijns, Keijsers, Branje, & Meeus, 2010). Others make the case that, as alluded to earlier, children's disclosure to parents contributes to children's adjustment by increasing parents' knowledge of children's life, thereby allowing parents to provide support and advice to children (e.g., Cheung et al., in press; Stattin & Kerr, 2000; Kerr & Stattin, 2000; Soenens et al., 2006).

Unfortunately, however, due to the lack of empirical evidence, it remains unclear why disclosure benefits children's adjustment. Given the possible facilitating contribution of children's disclosure to their sense of responsibility to parents, children's sense of responsibility to parents may account – at least in part – for the effect of children's disclosure to their parents on their academic adjustment.

Culture and Gender Considerations

There may be variation in the transactions between children's sense of responsibility to parents and their disclosure to them as well as the role of such transactions in children's academic adjustment. For one, the cultural context in which children and parents reside may shape these processes. Adolescence in Western countries such as the United States is generally marked by children's establishing independence from their parents (Greenfield, Keller, Fuligni, & Maynard, 2003), whereas it is typically characterized by children's fulfilling their responsibilities to parents in East Asian countries, such as China, given the emphasis on filial piety (Nelson & Chen, 2007; Pomerantz et al., 2011; Yu, 1996). As a consequence, it is possible that American children are less likely than their East Asian counterparts to see disclosure as part of being responsible to their parents given that it may interfere with the independence children are attempting to establish as they enter adolescence. When children do disclose, American parents may not emphasize issues regarding responsibility to the same extent as Chinese parents who may be influenced by filial piety concerns. However, it is also possible that in both countries, once children have a sense of responsibility to parents, they feel it is their duty to disclose to them, with parents similarly emphasizing responsibility as this is likely an important socialization goal for American and Chinese

parents. Such similarity, along with similarity in the implications for children's academic adjustment, is particularly likely given that children's sense of responsibility and disclosure to their parents predicts children's academic adjustment in the United States and China similarly (Cheung et al., in press; Fuligni et al., 1999; Fuligni & Zhang, 2004; Pomerantz et al., 2011).

It is also possible that children's gender creates variability. The case has been made that because women possess more interdependent self-construals than do men (Cross, Gore, & Morris, 2003; Cross, Bacon, & Morris, 2000), they are more concerned with strengthening their connectedness to others whom they view as central to their definition of themselves (Markus & Kitayama, 1991). The fulfillment of such connectedness may also be more crucial for women's adjustment, because relationships with others give the self meaning for individuals holding interdependent self-construals (Markus & Kitayama, 1991) – a process that may begin during childhood (Cross et al., 2003). Given that disclosure is a normative way to foster quality relationships (Finkenauer, Engels, Branje, & Meeus, 2004; Johnson, 1974; Kerr, Stattin, & Trost, 1999), girls may be more likely than boys to disclose to parents (see also, Keijsers, Branje, Frijns, et al., 2010). Indeed, there is much evidence that girls disclose to parents more than do boys during adolescence (Daddis & Randolph, 2010; Keijsers, Branje, VanderValk, et al., 2010; Smetana et al., 2006; Soenens et al., 2006; Stattin & Kerr, 2000; Vieno, Nation, Pastore & Santinello, 2009). In terms of the effects of disclosure, however, the evidence to date is not conclusive. Some research finds that the quality of children's relationships with their parents is predictive of their disclosure, and vice versa, among girls but not boys, during adolescence (Daddis & Randolph, 2010; Keijsers,

Branje, Frijns, et al., 2010). Other research finds that children's disclosure to their parents is associated with parent-child relationship quality and child adjustment similarly among girls and boys during adolescence (e.g., Keijsers, Branje, VanderValk, et al., 2010; Masche, 2010; Soenens et al., 2006; Vieno et al., 2009).

Overview of the Current Research

My dissertation research was guided by two major questions. The first was whether children's sense of responsibility and disclosure to their parents transact over time. I investigated children's sense of responsibility to their parents as manifest in their feelings of obligation to them and their parent-oriented motivation in school. It was anticipated that both would predict children's disclosure to their parents over time which, in turn, would predict both manifestations of children's sense of responsibility to their parents over time. In these analyses, I attempted to exclude the possibility that the transactions between children's sense of responsibility and their disclosure to their parents was driven by the associated changes between the two that were due to the quality of children's relationships with their parents. This was of import given that parent-child relationship quality is associated with both children's sense of responsibility to their parents (Pomerantz et al., 2011) and their disclosure to them (Cheung et al., in press).

The second question was how the transactions between children's sense of responsibility to parents and disclosure to them contribute to children's academic adjustment, with attention to mediational issues. In examining children's academic adjustment, I focused on children's self-regulated learning strategies – an important form of children's academic engagement which contributes to children's achievement (e.g.,

Wang & Pomerantz, 2009. For a review, see Wigfield, Eccles, Schiefele, Roeser, & Davis-Kean, 2006). I anticipated that the positive effects documented in prior research of children's sense of responsibility to parents on such academic adjustment would be mediated by children's disclosure; I also expected that the effects of children's disclosure would be mediated by children's sense of responsibility to their parents.

I investigated these issues among children during early adolescence because this is a time when connectedness between children and their parents often declines – at least in Western countries (e.g., Buhrmester & Furman, 1987; Laursen, Coy, & Collins, 1998; Pomerantz, Qin, Wang, & Chen, 2009), with a parallel trend in children's disclosure to their parents (Cheung et al., in press; Keijsers et al., 2009; Masche, 2010). Thus, this may be a critical time to understand how some children refrain from such a downward trajectory, with attention to the implications for children's academic adjustment, which also declines during this time (e.g., Anderman & Midgley, 1997; Eccles, Wigfield, Flanagan, Miller, Reuman, & Yee, 1989; Wang & Pomerantz, 2009). Data was drawn from the University of Illinois US-China Adolescence Study in which children in the United States and China participated over four waves during the seventh and eighth grades (e.g., Pomerantz et al., 2009; Qin, Pomerantz, & Wang, 2009). This allowed me to identify whether the proposed transactions and the hypothesized mediational processes hold over time in the two countries where the norms of adolescence may be different (Pomerantz et al., 2011). Attention was also given to the role of gender.

METHOD

Participants

Participants were 374 (187 boys and 187 girls) American seventh graders (mean age = 12.78 years, $SD = .34$, in the fall semester of seventh grade) and 451 (240 boys and 211 girls) Chinese seventh graders (mean age = 12.69 years, $SD = .46$, in the fall semester of seventh grade) who took part in the US-China Adolescence Study (e.g., Pomerantz et al., 2009; Qin et al., 2009). They were recruited from average and above-average achieving schools located in working- and middle-class suburbs of major cities in the United States and China. The American children attended one of two public schools consisting of the seventh and eighth grades in the suburbs of Chicago. According to the 2000 United States Census, Chicago is a high-density city (12,750 people per square mile) with 30% of the population over the age of 25 having at least a four-year college degree; the median yearly family gross income is \$61,182 (US Census Bureau, 2007). The two selected suburbs have lower population densities (1,761 and 6,247 people per square mile) and educational attainment (21% and 26% of the population over 25 have at least a four-year college degree), with median family gross incomes of \$60,057 and \$72,947 (US Census Bureau, 2007). Reflecting the ethnic composition of the areas, participants were primarily European American (88%); the remaining participants were Hispanic American (9%), African American (2%), and Asian American (1%).

The Chinese children attended one of two public schools in the suburbs of Beijing; one school consisted of the seventh to ninth grades and the other of the seventh to 12th grades. Beijing is a high-density city (13,386 people per square mile) with 13% of the population over the age of six having at least a four-year college degree; the annual

discretionary (i.e., after taxes) income per capita is 15,638 RMB (Beijing Municipal Bureau of Statistics, 2005). The two selected suburbs have lower population densities (904 and 11,070 people per square mile) with 9% and 28% of the population over the age of six having at least a four-year college degree (Beijing Municipal Bureau of Statistics, 2005); the annual discretionary incomes per capita are 12,279 and 16,230 RMB (Beijing Chorography Editing Committee, 2005). Over 95% of the residents are of the *Han* ethnicity (Beijing Municipal Bureau of Statistics, 2005). An opt-in consent procedure was used in which parents provided permission for children to participate. Participation rates were 64% in the United States and 59% in China.

Procedure

Beginning in the fall of seventh grade, children completed questionnaires during two 45-min. sessions every six months until the end of eighth grade. In total, there were four waves of data collection: Fall of seventh grade (Wave 1), spring of seventh grade (Wave 2), fall of eighth grade (Wave 3), and spring of eighth grade (Wave 4). A trained native research assistant read the instructions and items aloud to children in their native language in the classroom; children responded on their own using rating scales. Attrition over the entire study was 4% (6% in China and 2% in the United States). Ninety-one percent of children had the data required for all the analyses at three or more waves of the study. At Wave 1, children with no missing data did not differ from those with missing data on any of the variables I used in my dissertation.

Measures

The measures were initially created in English. Standard translation and back-translation procedures (Brislin, 1980) were followed to generate the Chinese versions. Linguistic factors were taken into account to ensure that the measures were understandable to children in both countries. For example, there were a few cases in which literal translation of the items from English to Chinese was awkward or ambiguous. In such cases, new items with similar meanings were created in English to replace the old items and then translated into Chinese. Minor modifications were also made to some items so that they would be relevant to the lives of children in not only the United States, but also China. Pilot testing with children in seventh grade indicated that the measures were understandable and meaningful to both American and Chinese children. The items for each of the measures are provided in the appendices.

Our research team has tested measurement equivalence for the measures I used in my dissertation. A series of two-group SEM Confirmatory Factor Analyses (CFAs) were conducted to examine the factorial and intercept invariance of the measures between the United States and China over the four waves of the study (e.g., Cheung et al., in press; Pomerantz et al., 2011; Wang et al., 2009). Factorial and intercept invariance is essential and sufficient in making valid comparisons of the associations and the means, respectively (Little, 1997; Steenkamp & Baumgartner, 1998). In each set of CFAs, the unconstrained model was compared with constrained models (i.e., factorial and intercept invariance models). The unconstrained model consisted of the same latent construct (based on two parcels of multiple items determined conceptually when possible, but otherwise randomly) repeatedly assessed over the four waves yielding a total of four

latent constructs which were allowed to correlate with one another; errors of the same indicators over time were also allowed to correlate (Keith, 2006; McDonald & Ho, 2002) when suggested by modification indexes from the CFAs conducted on the sample with no missing data. The factor loadings and intercepts in the unconstrained models were freely estimated without any across-time or between-country equality constraints.

In the more parsimonious constrained models, which were each identical to their corresponding unconstrained models otherwise, the factor loadings and intercepts of the same indicators were forced to be equal across countries and waves separately. If the unconstrained model fit the data well, a decrease in the TLI or increase in RMSEA of less than .05 from an unconstrained model to a corresponding constrained model was taken as indicative that the unconstrained model fit the data as well as the more parsimonious constrained model, suggesting equivalence in factor loadings or intercepts between countries and over time (Little, 1997). In previous analyses of this dataset, using such criteria, all the measures I used were found to have factorial and intercept equivalence (see Cheung et al., in press; Pomerantz et al., 2011; Wang et al., 2009).

Sense of Responsibility to Parents

Feelings of obligation to parents. As described by Pomerantz and colleagues (2011), children's feelings of obligation to their parents were assessed with four items from Fuligni and colleagues' (1999) measure of family obligation and five from Ng, Loong, Liu, and Weatherall's (2000) measure. The items were ones particularly relevant to children during early adolescence in the United States and China. The three components (i.e., respect for the family, current assistance, and future support) of family obligation identified by Fuligni and colleagues were all represented. Given the focus of

the current investigation, the items asked about obligation to parents (e.g., “How much do you feel you should spend time at home with your parents?” “How much do you feel you should help your parents financially when they get older?”). For each of the nine items, children indicated how much (1 = not at all; 5 = very much) they should engage in the activity described. The items were combined, with higher numbers representing greater feelings of obligation (α s = .85 to .93 in the United States and .81 to .88 in China).

Parent-oriented motivation in school. To assess children’s motivation in school to please their parents, six of the items from Dowson and McInerney’s (2004) social approval and responsibility scales were modified so that they referred to parents; we also created six additional items (Pomerantz et al., 2011). Children indicated how true (1 = not at all true; 5 = very true) the 12 reasons about why they try to do well at school are of them (e.g., “To please my parents.” “To show my parents that I am being responsible.”). Their responses were combined, with higher numbers representing greater motivation to please parents (α s = .92 to .95 in the United States and .90 to .94 in China).

Disclosure to Parents

Ten items were employed to assess children’s spontaneous disclosure to parents about such issues as their friends, academics, and whereabouts (e.g., “I often start a conversation with my parents about what happens in school.” “I hide a lot from my parents about what I do at nights and on weekends.”). Five of these items were from the original measure used by Kerr and Stattin (2000; see also Stattin & Kerr, 2000) with slight modifications to either make the items more concrete or ensure that it was clear that children initiated the disclosure or the secret keeping. We created an additional five items; most, but not all, of these were about academics, given our focus on this area of

children's adjustment. Children indicated (1 = not at all true of me; 5 = very true of me) the extent to which each item characterized them. After reverse scoring three items, the items were combined, with higher numbers representing greater spontaneous disclosure to parents (α s = .85 to .86 in the US and .82 to .87 in China).

Parent-Child Relationship Quality

The quality of children's relationships with parents was assessed with the Inventory of Parent Attachment (Armsden & Greenberg, 1987). One of the original 25 items referring to children's relationships with parents ("My parents have their own problems, so I don't bother them with mine.") was dropped because its association with the other items suggested it reflected a lack of feelings of closeness in the US but not China. The measure assesses three aspects of children's perceptions of the quality of their relationships with parents: Trust, communication, and alienation. The 10-item trust subscale (e.g., "My parents respect my feelings.") assesses children's perceptions of parents' responsiveness, respect, and warmth toward them. Eight items comprise the communication subscale (e.g., "My parents help me to understand myself better."), which assesses the quality of general communication between parents and children. The alienation subscale assesses children's feelings of resentment toward and emotional isolation from parents with six items (e.g., "I feel angry with my parents."). Children indicated how true each item was of them (1 = not at all true; 5 = very true). The mean of the three scales was taken (reverse scoring the alienation subscale), with higher numbers indicating better quality relationships (α s = .79 to .82 in the US and .80 to .82 in China).

Self-Regulated Learning Strategies

To assess children's self-regulated learning strategies, children were asked to respond to the 30 items from Dowson and McInerney's (2004) Goal Orientation and Learning Strategies Survey. This survey examines five types of self-regulated learning strategies. There are six statements about rehearsal (e.g., "When I want to learn things for school, I practice repeating them to myself."), six about elaboration (e.g., "I try to understand how the things I learn in school fit together with each other."), six about monitoring (e.g., "I check to see if I understand the things I am trying to learn."), six about planning (e.g., "I try to plan out my schoolwork as best as I can."), and six about regulating (e.g., "If I get confused about something at school, I go back and try to figure it out."). For each, children rated how true (1 = not at all; 5 = very) it was of them. The 30 items were combined, with higher numbers indicating greater use of self-regulated learning strategies (α = .96 to .97 in the United States and .93 to .96 in China).

RESULTS

Analysis Overview

Following a preliminary set of analyses, two central sets of analyses were conducted to examine the guiding questions. In the first, I investigated the transactions between children's sense of responsibility and their disclosure to their parents over the four waves of data. The hypothesis was that children's sense of responsibility to their parents fosters their heightened disclosure to them, which in turn enhances children's sense of responsibility to their parents over time. The goal of the second set of analyses was to unpack the mechanisms by which children's sense of responsibility to their parents and disclosure to them contribute to children's academic adjustment as manifest in their use of self-regulated learning strategies. It was expected that children's sense of responsibility and disclosure to their parents would each act as a mediator for the other's effects in children's academic adjustment.

For both questions, the focal analyses were conducted with Auto-regressive Latent Trajectory (ALT) models (e.g., Bollen & Curran, 2004, 2006; Bollen & Zimmer, 2010). Taking children's sense of responsibility and their disclosure to their parents for example, as shown in Figure 1, the ALT model combines a bivariate latent trajectory model and an auto-regressive model. In the portion of the bivariate latent trajectory model, latent intercept and slope factors were used to describe the growth trajectories of children's sense of responsibility to their parents and disclosure to them. The factor loadings of the intercept parameter on children's sense of responsibility (or their disclosure) to their parents at the four waves were all fixed to 1, with those of the slope parameter fixed to 0, 1, 2, and 3, respectively (see Figure 1). By such specification, the

intercept indicates children's sense of responsibility (or disclosure) to their parents in the fall of seventh grade when the study began, and the slope indicates the linear rate of change in children's sense of responsibility (or disclosure) across the four waves of the study. Correlations between the intercepts and slopes are also included in the model. By examining the correlations of the two slopes, the bivariate latent trajectory portion of the ALT model indicates whether changes in children's sense of responsibility to their parents are associated with changes in children's disclosure to them over time. However, because the slope correlation reflects the association between concurrent changes in the two constructs, the direction of effects is ambiguous.

Of key import is the auto-regressive portion of the ALT model which includes paths of six-month stability in children's sense of responsibility to their parents and disclosure to them, within-wave covariance between the two, and cross-lag regression paths from the fall of seventh grade to the spring of eighth grade with six-month intervals (see Figure 1). By such specification, the cross-lag paths capture the transactional effects between children's sense of responsibility and disclosure to parents over time, while controlling for the concurrent associations between the two as well as each construct's stability. Importantly, because the ALT model incorporates the auto-regressive model *with* the bivariate latent trajectory model, it controls the underlying shared trajectory of children's sense of responsibility and disclosure to their parents over time, while examining the transactional effects of the two. As a consequence, it rules out the possibility that the lagged effects identified are due simply to associated change that may be driven by a third variable. Thus, the ALT model provides more accurate estimates of the cross-lag associations than the autoregressive model (Curran & Bollen, 2001; Bollen

& Zimmer, 2010). For example, children's sense of responsibility to parents and disclosure to them may change together not because of their effects on one another as I have hypothesized, but rather because the two are both associated with the quality of children's relationships with their parents which also changes. By controlling the shared trajectories of children's sense of responsibility and disclosure, the ALT model excludes the possibility that the observed transactional effects are driven by such correlated change.

All analyses were conducted within the framework of Structural Equation Modeling (SEM) using AMOS 17.0 (Arbuckle, 1995-2008). Full Information Maximum Likelihood (FIML) estimates were used to handle missing data. FIML provides less biased estimates than other approaches to handling missing data such as list- and pair-wise deletion or mean-imputation (Arbuckle, 1996; Wothke, 2000). In evaluating the fit of individual SEM models, three statistics were examined following conventional criteria (Kline, 2005; McDonald & Ho, 2002): The Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI), with values greater than .95 indicating a good fit and values less than .95 but greater than .90 indicating an adequate fit; the Root Mean Square Error of Approximation (RMSEA), with values smaller than .05 indicating a good fit and values greater than .05 but less than .08 indicating an adequate fit. Due to its sensitivity to sample size, the chi-square statistic (χ^2) relative to its degrees of freedom (df) is not recommended for appraising individual SEM models (Kline, 2005; McDonald & Ho, 2002), although it is presented for the interested reader. In comparing nested models, a significant chi-square difference ($\Delta\chi^2$) relative to its degrees of freedom (Δdf) between

the unconstrained and the more parsimonious constrained models indicates that the former fits better than the latter suggesting a between-country or -gender difference.

Part 1: Preliminary Analyses

Trajectories over Time

The means and standard deviations of the variables under investigation at each wave of data collection are presented in Table 1. Using the latent growth trajectory technique in the context of SEM, prior analyses revealed that as children progress through early adolescence, their disclosure to their parents declines over time in both the United States and China (Cheung et al., in press). Children's sense of responsibility to their parents, the quality of their relationships with parents, and their self-regulated learning strategies also decline in the United States, but remain stable (or increases in the case of parent-oriented motivation in school) in China (Pomerantz et al., 2009, 2011; Wang & Pomerantz, 2009).

Intercorrelations

As indicated by the correlations shown in Table 2, the two forms of children's sense of responsibility to their parents were associated with their disclosure to them at each wave. The more children felt obligated to their parents, the more they disclosed to them ($r_s = .46$ to $.56$ in the United States and $.40$ to $.42$ in China, $ps < .001$). A similar pattern emerged for children's parent-oriented motivation in school and disclosure: In the United States, except at Wave 1 ($r = .03$, ns), the two were positively associated ($r_s = .29$ to $.35$, $ps < .001$); in China, the two were positively associated at each wave ($r_s = .15$ to $.31$, $ps < .001$). Notably, although the two forms of sense of responsibility were positively associated at each wave within each country ($r_s = .21$ to $.49$ in the United States and $.34$

to .45 in China, $ps < .001$), children's feelings of obligation (vs. their parent-oriented motivation in school) were more strongly associated with their disclosure to parents at each wave ($ts > 2$, $ps < .05$) in the United States and China, except at Wave 4 in China ($t = 1.93$, ns). From Table 2, it can also be seen that the two forms of children's sense of responsibility were positively associated with their use of self-regulated learning strategies: The more children felt obligated to parents ($rs = .29$ to $.49$ in the United States and $.25$ to $.44$ in China, $ps < .001$) or were motivated to do well in school for their parents ($rs = .19$ to $.50$ in the United States and $.17$ to $.46$ in China, $ps < .001$), the more they used self-regulated learning strategies.

Part 2: Transactions between Sense of Responsibility and Disclosure

To examine the transactions between children's sense of responsibility and disclosure to their parents during early adolescence, the main analyses were conducted in three steps. In the first step, I examined the associated change between children's sense of responsibility and disclosure to their parents using bivariate latent trajectory models (see Figure 2). In the second step, the transactions between sense of responsibility and disclosure were examined using auto-regressive models (see Figure 3). In the third, the complete ALT models with both the bivariate latent trajectory portion and the auto-regressive portion were fit. In all steps, models were fit separately for the two forms of children's sense of responsibility to their parents. The models were fit for the whole sample first, and then two-group SEM comparison procedures were used to test for country and gender differences in the strength of each cross-lag path. An unconstrained model where all the cross-lag paths were freely estimated was compared to constrained

models where the cross-lag paths were specified to be equal one by one between the United States and China (or for boys and girls).

Testing for Associated Change

It was anticipated that as children progressed through early adolescence, changes in their sense of responsibility to their parents would be associated with changes in their disclosure to them. To this end, bivariate latent trajectory models were fit to examine the associated changes in the two forms of children's sense of responsibility (i.e., children's feelings of obligation to their parents and parent-oriented motivation in school) and disclosure to their parents.

Feelings of obligation. The bivariate latent trajectory model for children's feelings of obligation and disclosure to their parents fit the data adequately, CFI = .97, TLI = .95, RMSEA = .07, $\chi^2 = 118.50$, $p < .001$. There was a positive association (unstandardized $r = .24$, SE = .02; standardized $r = .64$, $p < .001$) between the obligation and disclosure intercept parameters, indicating that the more children felt obligated to their parents during the fall of the seventh grade, the more they disclosed to them during this time. Following two-group SEM comparison procedures, when this intercept association was constrained to be equal between the United States and China (and for boys and girls), the constrained models fit the data as well as the unconstrained model, $\Delta\chi^2 < 1$, indicating that the strength of this path was similar in the two countries and for the two genders.

Consistent with expectations, there was also a positive association (unstandardized $r = .02$, SE = .002; standardized $r = .61$, $p < .001$) between the two slope parameters, indicating that the trajectories of children's feelings of obligation and

disclosure to their parents overlapped: Children who maintained their feelings of obligation over the seventh and eighth grades also maintained their disclosure during this time. Two-group SEM comparison indicated that the strength of this slope association did not differ between boys and girls, $\Delta\chi^2 < 1$, *ns*; however, the association was stronger in the United States (unstandardized $r = .03$, $SE = .004$; standardized $r = .80$, $p < .001$) than China (unstandardized $r = .01$, $SE = .003$; standardized $r = .50$, $p < .001$): The model which constrained this path to be equal between the two countries fit the data worse than the unconstrained model, $\Delta\chi^2 = 10.09$, $p < .001$.

Parent-oriented motivation in school. The bivariate latent trajectory model for children's parent-oriented motivation in school and disclosure to their parents fit the data adequately, $CFI = .96$, $TLI = .94$, $RMSEA = .08$, $\chi^2 = 129.33$, $p < .001$. The intercept and the slope parameters of children's parent-oriented motivation and disclosure to parents were both positively associated. The more children were motivated to do well in school to please their parents as they entered the seventh grade, the more they disclosed to them during this time (unstandardized $r = .09$, $SE = .03$; standardized $r = .16$, $p < .001$). Importantly, those who maintained their parent-oriented motivation also maintained their disclosure to parents during the subsequent two years (unstandardized $r = .01$, $SE = .003$; standardized $r = .31$, $p < .001$). Two-group SEM comparison indicated that the model constraining the intercept association (or the slope association) to be equal between the United States and China (or boys and girls) fit the data as well as the unconstrained model, $\Delta\chi^2 < 1$, *ns*, indicating these associations do not differ between countries or genders.

Testing for Transactional Effects with Auto-regressive Models

The central hypothesis of this study is that children's sense of responsibility to parents enhances their disclosure to them over time; children's disclosure, in turn, fosters their sense of responsibility. Such transactions between children's sense of responsibility and disclosure to their parents may partially contribute to the associated changes between the two as indicated in the bivariate latent trajectory models. To examine these transactional effects, I conducted analyses using auto-regressive models (see Figure 3).

Feelings of obligation. The auto-regressive model for children's feelings of obligation and disclosure to their parents fit the data well, CFI = 1.00, TLI = .99, RMSEA = .04, $\chi^2 = 17.27$, $p < .05$. As anticipated, children's feelings of obligation to their parents and disclosure to them transacted over time (see Table 3): In both the United States and China, the more obligated children felt, the more they disclosed six months later adjusting for their disclosure the preceding six months. Children's disclosure to their parents at each wave also consistently predicted their enhanced feelings of obligation to their parents six months later. When the cross-lag paths across each six-month interval from children's feelings of obligation to their disclosure or from children's disclosure to their feelings of obligation were constrained to be equal between the United States and China (or boys and girls) one by one, these more parsimonious models fit the data as well as the unconstrained model, $\Delta\chi^2s < 1.92$, *ns*, indicating that the strength of these cross-lag paths were similar across the two countries and genders.

Parent-oriented motivation in school. The auto-regressive model for children's parent-oriented motivation in school and disclosure to parents fit the data well, CFI = 1, TLI = .99, RMSEA = .04, $\chi^2 = 18.19$, $p < .05$. As shown in Table 3, consistent with

expectations, a transactional process was evident between children's parent-oriented motivation in school and disclosure to their parents: The more children disclosed to their parents at the beginning of the seventh grade, the more motivated they were to do well in school for their parents six months later, which in turn predicted their enhanced disclosure to them at the fall of eighth grade. Children's disclosure at the spring of seventh grade also predicted their enhanced parent-oriented motivation six months later. It is of note, however, that the effect of children's parent-oriented motivation on their disclosure was evident only from Wave 2 to Wave 3, and children's disclosure did not predict their parent-oriented motivation from Wave 3 to Wave 4. The strength of the cross-lag paths from children's parent-oriented motivation to disclosure and from children's disclosure to parent-oriented motivation did not differ between the United States and China (or boys and girls), as the parsimonious models constraining each cross-lag path to be equal between the two countries (or the two genders) fit the data as well as the unconstrained model, $\Delta\chi^2_s < 2.39$, *ns*.

Testing for Transactional Effects with ALT Models

The transactional effects between children's sense of responsibility and disclosure to their parents identified in the auto-regressive model may reflect that the two have shared developmental trajectories that are driven by third variables. To eliminate this alternative explanation, I conducted analyses with the ALT model (see Figure 1), reexamining the transactional effects between children's sense of responsibility and disclosure to their parents, while adjusting for their shared trajectories. By controlling the associated changes between the focal constructs, the ALT model provides a more accurate examination of the transactional effects between the two (Curran & Bollen,

2001). When fitting the ALT model, given the complexity of the model, the auto-regressive paths of each construct in the model were constrained to be equal to avoid converging difficulty (Bollen & Curran, 2004; For a similar approach, see Williams & Steinberg, 2011). Preliminary analyses showed there were no differences in the strength of the correlations (see Table 2) of children's feelings of obligation to their parents, parent-oriented motivation in school, or disclosure to their parents, from Wave 1 to 2, Wave 2 to 3, and Wave 3 to 4, $ts < 1.8$, *ns*, indicating the auto-regressive paths were similar in strength across time. The ALT models were fit for the whole sample first, and then two-group comparison models were fit to determine whether country (or gender) moderated the cross-lag paths between children's sense of responsibility and disclosure.

Feelings of obligation. The ALT model for children's feelings of obligation and disclosure to their parents fit the data well, CFI = 1, TLI = 1, RMSEA = 0, $\chi^2 = 9.09$, *ns*. By combining the auto-regressive model with the bivariate latent growth model, the ALT model significantly improved the fit of the bivariate latent growth model, $\Delta\chi^2 = 109.41$, $p < .001$, which was mainly due to adding cross-lag paths into the model (see Table 4). With the exception of the Wave 1 to Wave 2 path, consistent with expectations, the more obligated children felt to their parents, the more they disclosed to them six months later (see Table 5). Indicative of a transactional process, it was also the case that, with the exception of the Wave 1 to Wave 2 path, the more children disclosed to their parents, the more obligated they subsequently felt to them (see Table 5). Such transactional effects appear to account for the slope association between children's feelings of obligation and disclosure to parents, given that the strength of this association in the bivariate latent growth model was reduced to nonsignificance in the ALT model (unstandardized $r = .01$,

SE = .00; standardized $r = .19$, *ns*). Two-group model comparison indicated that the transactional effects were similarly evident in the United States and China, $\Delta\chi^2 < 1$, *ns*. The path from children's feelings of obligation at the first wave to their disclosure six months later significantly differed between boys and girls, $\Delta\chi^2 = 5.51$, $p < .05$, but the meaning of this gender difference was unclear given that this path was not significant for either gender (unstandardized $r = .00$, SE = .03 for boys and $r = .01$, SE = .03 for girls; standardized $r = .00$ for boys and girls, *ns*). The size of all other cross-lag paths did not differ for boys and girls, $\Delta\chi^2 < 3.6$, *ns*.

Parent-oriented motivation in school. The ALT model for children's parent-oriented motivation in school and disclosure to their parents fit the data well, CFI = .99, TLI = .96, RMSEA = .04, $\chi^2 = 42.28$, $p < .001$, and significantly better than the bivariate latent growth model, $\Delta\chi^2 = 87.05$, $p < .001$. As shown in Table 4, such improvement in model fit was mainly due to adding cross-lag paths into the bivariate latent growth model. Consistent with expectations, analyses with the ALT model indicated that children's parent-oriented motivation in school and disclosure also transacted over time (see Table 5): With the exception of the Wave 1 to Wave 2 path, children's heightened parent-oriented motivation in school was predictive of their enhanced disclosure to parents six months later; children's disclosure, in turn, predicted their enhanced motivation to do well in school to please their parents over time. Possibly due to such transactional process, the correlation between the slope factors of children's parent-oriented motivation and disclosure to parents in the bivariate latent growth model was reduced to nonsignificance (unstandardized $r = .00$, SE = .01; standardized $r = .01$, *ns*). Two-group model comparison indicated that country and gender did not moderate the transactional

effects between children's parent-oriented motivation in school and disclosure to parents, $\Delta\chi^2_s < 2.09$, *ns*.

Supplementary Analyses

Two sets of supplementary analyses were conducted to further understand the identified transactional process. The aim of the first was to exclude the quality of the relationships between children and their parents as an alternative explanation for the observed transactional effects between children's sense of responsibility and disclosure to their parents. The aim of the second set was to examine whether the transactional effects were specific to the domain (i.e., academic vs. other) of children's disclosure.

Relationship quality. Children's sense of responsibility and disclosure to their parents may transact over time because they are both associated with positive relationships between children and their parents. Although the ALT model takes a step toward ruling this possibility out, it does so indirectly by adjusting for associated changes between children's sense of responsibility and disclosure that may be due to third variables. Given that it is quite viable that the quality of children's relationships with their parents may be one of such third variables, I took an additional step to exclude it as alternative explanation for the observed transactional effects. Changes in the quality of children's relationships with parents may drive the transactions between children's sense of responsibility and disclosure to their parents, as well as their associated changes over time. Indeed, children's disclosure to their parents, feelings of obligation to them, and parent-oriented motivation in school were all positively associated with the quality of their relationships with their parents (see Table 2). Additionally, consistent with prior research (Keijsers, Branje, et al., 2010), children's disclosure to their parents and the

quality of their relationships with them transacted over time as indicated by auto-regressive models (see Table 6). Children's sense of responsibility also appeared to transact with relationship quality in auto-regressive models, although for children's parent-oriented motivation and relationship quality, such a trend was evident only from Wave 1 to Wave 2 (see Table 6).

However, given that children's feelings of obligation (and parent-oriented motivation), disclosure to their parents, and the quality of their relationships with their parents are intercorrelated, the transactional effects involving relationship quality identified in the auto-regressive models may be driven by a third construct that was associated with the two. For example, the effects of children's relationship quality on their disclosure may be due to associated changes driven by children's feelings of obligation. Indeed, analyses with the ALT model, which adjusted for associated changes between the focal constructs that may be driven by third variables, indicated that relationship quality generally did not predict children's feelings of obligation to their parents, parent-oriented motivation, or disclosure to their parents over time (see Table 6). Thus, it is unlikely that relationship quality drives the observed transactional effects between children's sense of responsibility and disclosure to their parents.

Disclosure in academic vs. nonacademic domain. It is possible that the observed transactional effects are driven by the domain of children's disclosure. Given that school is one of the major life arenas during adolescence, children may be particularly likely to have a heightened sense of responsibility to their parents in the academic domain, which may lead them to disclose to their parents on academic issues more than other issues. To identify whether the observed transactional effects are conditional on the domain of

children's disclosure, I separated the items for children's disclosure about academic and non-academic issues, and reran the ALT model to examine the proposed transactions in the academic versus non-academic domain. Three items captured children's disclosure in the academic domain (e.g., "I often start conversations with my parents about what happens in school." α s = .68 to .70 in the United States and .63 to .74 in China), and seven reflected children's disclosure in the non-academic domain (e.g., "I like to tell my parents about the things I do with my friends." α s = .80 to .82 in the United States and .75 to .81 in China). Two-group Confirmatory Factor Analyses (CFA) indicated that children's disclosure about academic and non-academic issues both possessed factorial and intercept equivalence in the United States and China over time, χ^2 s < 308, ps < .001, CFIs > .97, TLIs > .91, RMSEAs < .05, Δ TLIs < .05, Δ RMSEAs < .02. As shown in Table 7, the transactional effects between children's sense of responsibility and disclosure were similarly evident in the two domains.

Summary

Taken together, the findings support the idea that during early adolescence, children's sense of responsibility and disclosure to their parents transact over time: The more children felt obligated to their parents and were motivated to do well in school for their parents, the more they disclosed to them over time; children's disclosure, in turn, was predictive of both forms of children's sense of responsibility to their parents over time. These transactions were evident from Wave 2 to Wave 4 in both the auto-regressive models and the ALT models, and did not vary by country or gender. In addition, they did not appear to be driven by children's disclosure on academic (vs. nonacademic) issues or by the associated changes in children's sense of responsibility and disclosure to their

parents that are due to third variables such as the quality of children's relationships with their parents.

Part 3: The Mediating Role of Sense of Responsibility and Disclosure

The second question guiding my dissertation was how the transactions between children's sense of responsibility and disclosure to their parents contribute to children's academic adjustment as manifest in their use of self-regulated learning strategies. It was anticipated that children's sense of responsibility (or disclosure) to their parents exerts its influence on their self-regulated learning strategies through their disclosure (or sense of responsibility) to their parents. Following Cole and Maxwell's (2003) guidelines for testing mediation with multiple-wave longitudinal data, I examined the proposed mediational processes in the two sets of three adjacent waves (i.e., from Wave 1 to Wave 3 and Wave 2 to Wave 4). Two sets of analyses were conducted, first with the auto-regressive model and then with the ALT model. The models were fit on the whole sample first, followed by two-group comparisons to examine whether the strength of the mediational paths differed in the United States and China or for boys and girls. To examine the statistical significance of the mediated effects, the Sobel test was employed.

Testing for Mediation with the Auto-regressive Model

In testing whether the transactions between children's sense of responsibility and disclosure to their parents contribute to the effect of children's sense of responsibility (or disclosure) to their parents on their use of self-regulated learning strategies, I first conducted longitudinal mediation analyses in the context of SEM with the auto-regressive model. In these analyses, the stability of the three focal constructs (i.e., children's sense of responsibility, disclosure, and academic adjustment) from the fall of

seventh grade to the spring of eighth grade, as well as the covariances among them within each wave were taken into account.

To examine the total effect of children's sense of responsibility (or disclosure) on their self-regulated learning strategies, children's sense of responsibility (or disclosure) at Wave 1 and Wave 2 were used to predict learning strategies one and a half year later (see Figure 4). These models fit the data adequately, CFIs > .96, TLIs > .92, RMSEAs < .08, χ^2 s < 224, p s < .001. As shown in Table 8, consistent with prior research (Pomerantz et al., 2011; Cheung et al., in press), children's feelings of obligation and disclosure to their parents predicted their enhanced self-regulated learning strategies over time. Children's parent-oriented motivation did not significantly predict their learning strategies one year later, but prior research indicates that this effect was evident over two year's time (Pomerantz et al., 2011), suggesting the effect of parent-oriented motivation may take time to unfold. Two group model comparison indicated that the size of these effects were similar in the United States and China (and for boys and girls), $\Delta\chi^2$ s < 3.18, ns , except that parent-oriented motivation at Wave 2 predicted children's enhanced self-regulated learning at Wave 4 in the United States (unstandardized coefficient = .08, SE = .03; standardized coefficient = .09, p < .05) but not China (unstandardized coefficient = -.04, SE = .03; standardized coefficient = -.05, ns), $\Delta\chi^2$ = 6.58, p = .01.

To examine the indirect effects of children's sense of responsibility (or disclosure) on their learning strategies, as shown in Figure 5, children's sense of responsibility and disclosure were modeled to transact over time. Children's self-regulated learning strategies at Wave 3 and Wave 4 were each predicted from their sense of responsibility and disclosure in the preceding two waves.

Feelings of obligation. The model for children's feelings of obligation, disclosure, and self-regulated learning strategies fit the data adequately, CFI = .99, TLI = .96, RMSEA = .06, $\chi^2 = 88.25$, $p < .001$. As shown in Table 9, children's feelings of obligation at Wave 1 and 2 both predicted their enhanced disclosure to parents six months later, which in turn predicted their heightened use of self-regulated learning strategies at the following wave. The indirect effects of children's feelings of obligation on self-regulated learning strategies via their disclosure were significant both from Wave 1 to 3, $z = 2.08$, $p < .05$, and from Wave 2 to 4, $z = 1.98$, $p < .05$, providing evidence for the mediating role of disclosure in the link between children's feelings obligation and their learning strategies.

It was also the case that the more children disclosed to their parents at Wave 1 the more they felt obligated to them at Wave 2, which in turn was predictive of children's self-regulated learning strategies at Wave 3 (see Table 9). However, the Sobel test indicated this indirect effect of children's disclosure on their learning strategies was not significant, $z = 1.46$, *ns*. Disclosure at Wave 2 predicted children's heightened feelings of obligation at Wave 3, but such obligation did not predict children's learning strategies six months later (see Table 9). Thus it does not appear that children's feelings of obligation underlie the effect of their disclosure on their self-regulated learning strategies. Two group model comparison indicated that the strength of all the indirect effect paths were similar in the United States and China (and for boys and girls), $\Delta\chi^2 < 3.25$, *ns*.

Parent-oriented motivation. The model for children's parent-oriented motivation, disclosure, and self-regulated learning strategies fit the data adequately, CFI = .98, TLI = .95, RMSEA = .07, $\chi^2 = 112.44$, $p < .001$. As shown in Table 9, although parent-oriented

motivation at Wave 1 did not predict children's heightened disclosure to their parents six months later, such motivation at Wave 2 did. Children's disclosure to their parents at Wave 2 and 3 predicted their greater use of self-regulated learning strategies six months later. Two group model comparison indicated that the effect of disclosure at Wave 2 on learning strategies at Wave 3 was only evident in China (unstandardized coefficient = .05, SE = .04; standardized coefficient = .05, *ns*, in the United States; unstandardized coefficient = .17, SE = .04; standardized coefficient = .20, $p < .001$, in China), $\Delta\chi^2 = 5.69$, $p < .001$. The size of all other indirect effect paths was similar in the United States (and for boys and girls), $\Delta\chi^2 < 3.35$, *ns*. The indirect effect of children's parent-oriented motivation at Wave 2 on their self-regulated learning strategies at Wave 4 via their disclosure to their parents was significant, $z = 1.92$, $p < .05$, indicating disclosure acted as a mediator for the link between children's parent-oriented motivation and their self-regulated learning strategies over this time period.

Children's disclosure at Wave 1 and 2 predicted their enhanced parent-oriented motivation six months later (see Table 9). In turn, parent-oriented motivation at Wave 2 was predictive of children's greater self-regulated learning strategies six months later (see Table 9). Children's parent-oriented motivation at Wave 3 also predicted their enhanced self-regulated learning at Wave 4, but this effect was evident only for boys (unstandardized coefficients = .08, SE = .04; standardized coefficient = .09, $p < .05$, for boys; unstandardized coefficient = -.03, SE = .04; standardized coefficient = -.04, *ns*, for girls), $\Delta\chi^2 = 4.40$, $p < .001$. The size of all other indirect effect paths was similar across countries and genders, $\Delta\chi^2 < 3.29$, *ns*. The indirect effect of children's disclosure at Wave 1 on their self-regulated learning strategies at Wave 3 via parent-oriented

motivation was significant, $z = 3.36, p < .001$, indicating parent-oriented motivation underlies the link between disclosure and self-regulated learning from Wave 1 to 3. Although there was a tendency for children's disclosure at Wave 2 to predict their self-regulated learning strategies at Wave 4 via their parent-oriented motivation among boys, the Sobel test indicated such an indirect path was not significant, $z = 1.71, ns$.

Testing for Mediation with ALT Model

The mediational effects identified with the auto-regressive model may be driven by the shared trajectories of the constructs under investigation that were due to third variables. To exclude such a possibility, I reexamined the proposed mediational effects by adjusting for the shared trajectories with the ALT model. These mediational analyses were conducted from Wave 2 to 4, given that sense of responsibility and disclosure did not predict each other significantly from Wave 1 to 2 as indicated by the transactional analyses with ALT model (see Table 4). The trajectories of children's sense of responsibility, disclosure, and self-regulated learning strategies were each modeled with a latent intercept and a slope factor, which were allowed to covary. The error terms of these three constructs were intercorrelated within each wave. The stabilities of children's sense of responsibility, disclosure, and their self-regulated learning strategies were constrained to be equal to improve model fit and avoid convergence problems.

To examine the total effect of children's sense of responsibility (or disclosure) on their self-regulated learning strategies, sense of responsibility (or disclosure) at Wave 2 were used to predict learning strategies at Wave 4. These models fit the data well, CFIs = .99, TLIs < .98, RMSEAs < .05, χ^2 s < 105, $ps < .001$. Possibly due to the stringent control with the ALT model, the effects of children's feelings of obligation, parent-oriented

motivation, and disclosure to parents did not reach significance (unstandardized coefficients $< .01$, SEs = .01; standardized coefficients $< .01$). Two group model comparisons indicated that these effects did not differ between countries or genders, $\Delta\chi^2$ s < 2.63 , *ns*.

Given that Shrout and Bolger (2002) made the case that a significant association between the predictor and outcome variable is not necessary for distal meditational processes, although the total effect did not reach significance in the ALT model, I examined the indirect effects of children's sense of responsibility (or disclosure) on their use of self-regulated learning strategies. As shown in Figure 6, children's sense of responsibility and disclosure were modeled to transact over time from Wave 2 to Wave 4. Children's self-regulated learning strategies at Wave 4 were predicted from their sense of responsibility and disclosure at Wave 2 and 3. These models fit the data well, CFIs $> .97$, TLIs $> .95$, RMSEAs $< .05$, χ^2 s < 150 , $ps < .001$.

Feelings of obligation. After adjusting for shared trajectories, consistent with the patterns identified with the auto-regressive model, disclosure acted as a mediator for the link between children's feelings of obligation to parents and self-regulated learning strategies: Children's feelings of obligation at Wave 2 predicted their disclosure to parents six months later, which in turn predicted their heightened use of self-regulated learning strategies at Wave 4 (see Table 10). The Sobel test indicated that the indirect effect of children's feelings of obligation at Wave 2 on self-regulated learning strategies at Wave 4 via their disclosure was significant, $z = 1.96$, $p < .05$. There was no evidence that feelings of obligation mediated the effect of children's disclosure on their use of self-regulated learning strategies: Although disclosure at Wave 2 predicted heightened

feelings of obligation at Wave 3, such feelings did not enhance children's self-regulated learning at Wave 4 (see Table 10). Two-group model comparison indicated that these indirect effect paths did not vary between country or gender, $\Delta\chi^2_s < 3.6$, *ns*.

Parent-oriented motivation. After adjusting for shared trajectories, it was evident that disclosure acted as a mediator for the effect of children's parent-oriented motivation on their use of self-regulated learning strategies. As shown in Table 10, children's parent-oriented motivation at Wave 2 predicted their enhanced disclosure to parents at Wave 3, which in turn predicted their heightened self-regulated learning strategies at Wave 4. The indirect effect of children's parent-oriented motivation on their self-regulated learning via their disclosure to parents were significant, $z = 2.28$, $p < .05$. Similar to the findings with the auto-regressive model, after adjusting for shared trajectories, there was no evidence that children's parent-oriented motivation underlies the link between their disclosure and learning strategies. Although disclosure at Wave 2 predicted heightened parent-oriented motivation at Wave 3, such motivation did not predict children's self-regulated learning at Wave 4 (see Table 10). Two group model comparison indicated that the size of all the indirect effect paths were similar in the United States and China or for boys and girls, $\Delta\chi^2_s < 1.52$, *ns*.

Summary

In sum, longitudinal mediational analyses indicated that children's sense of responsibility to their parents exerted its influence on their self-regulated learning strategies through their disclosure to parents. The more children felt obligated to their parents or were motivated to do well in school to please them, the more they disclosed to them over time; children's disclosure, in turn, predicted their heightened use of self-

regulated learning strategies. These processes were evident from Wave 2 to Wave 4 in both the auto-regressive models and the ALT models, and did not vary by country or gender.

DISCUSSION

Despite the import of children's disclosure to parents in their psychological adjustment during adolescence (e.g., Kerr & Stattin, 2000; Stattin & Kerr, 2000; Keijsers, Branje, VanderValk, et al., 2010; Laird & Marrero, 2010), relatively little is known as to what leads children to disclose. The goal of the current research was to identify the role of children's sense of responsibility to parents in their disclosure to them during early adolescence in the United States and China – two countries that are likely to differ in their conceptions of adolescence (Pomerantz et al., 2011). In both countries children's sense of responsibility predicted their heightened disclosure to parents over time. Notably, children's disclosure also foreshadowed their sense of responsibility to parents over time such that the two transacted, mutually maintaining one another as children progressed through early adolescence. The transactions between children's sense of responsibility and disclosure to parents appeared to matter for children's academic adjustment, with disclosure mediating the link between children's sense of responsibility and their academic adjustment.

Transactions between Children's Sense of Responsibility and Disclosure to Parents

A key finding of the current research was the identification of a transactional process over time between children's sense of responsibility to parents – that's, children's feelings of obligation to parents and their parent-oriented motivation in school – and disclosure to parents. Extending prior research suggesting the quality of children's relationships with parents plays a role in whether children reveal information about their lives to parents (Keijsers, Branje, Frijns, et al., 2010), children's sense of responsibility to parents – another dimension of children's connectedness to them – predicted their

disclosure to parents over time. The more children felt obligated to parents in the spring of seventh grade, the more they disclosed to them in the fall of eighth grade over and above their disclosure in the previous spring. Children's feelings of obligation to parents in the fall of eighth grade also predicted their heightened disclosure to them in the spring of eighth grade. Similarly, children's parent-oriented motivation in school in the spring of seventh grade and in the fall of eighth grade predicted their enhanced disclosure to parents six-months later. It appears that, as has been argued by other investigators (Yau et al., 2009), children's sense of responsibility to parents leads them to see disclosure as an important duty on which they act.

Children's disclosure to parents also shaped their sense of responsibility to them. The more children disclosed to parents in the spring of seventh grade and in the fall of eighth grade, the more they felt obligated to parents and were motivated to do well in school to please them six months later, taking into account their earlier sense of responsibility. These positive effects of children's disclosure were consistent with idea that children's disclosure may provide an opportunity for parents to socialize them (see also Cheung et al., in press). It is possible that when children disclose, parents take the opportunity to communicate to children what it means to be responsible, which heightens children's sense of responsibility to parents over time. Given that children's internalization of their parents' socialization attempts is facilitated when parents are autonomy supportive and warm (Grolnick, Deci, & Ryan, 1997), it would be fruitful for future research to look into the conversations that ensue from children's disclosure to examine whether the style and content of parents' responses may moderate the effects of children's disclosure on their sense of responsibility to parents. Suggestive of this

possibility, American children's disclosure to parents predicts their autonomous motivation when parents are highly autonomy supportive (vs. controlling) as well as when there are positive relationships between children and parents (Cheung et al., in press).

Although conceptions of adolescence have been suggested to differ in the United States and China with heightened emphasis on children fulfilling their responsibilities to parents in China (Pomerantz et al., 2011), the transactions between children's sense of responsibility and disclosure to parents were similarly evident in the two countries. Such a lack of cultural differences was not surprising, given that children's connectedness to parents (e.g., Pomerantz et al., 2009, 2011) and disclosure to them (Cheung et al., in press) play a similar role in children's adjustment in the two countries. It is interesting, however, that the transactions were similarly evident between boys and girls. This appears to be inconsistent with prior research finding that the negative transactions between the quality of children's relationships with parents and their keeping secrets from parents are evident only among girls (Keijsers, Branje, Frijns, et al., 2010). It is unclear what contributes to these differential patterns of findings. It is possible that the two forms of children's connectedness to parents – that is, relationship quality and sense of responsibility to parents – have different effects on children's disclosure, with the effects of the latter similarly evident for boys and girls. It is also possible that secrecy, as a special form of children's disclosure to parents, transacts with children's connectedness to parents differentially among boys and girls.

It is of note that although the quality of children's relationships with their parents is associated with both children's sense of responsibility and their disclosure to their

parents (see Table 2), it is unlikely that the transactions between children's sense of responsibility and their disclosure to their parents were driven by associated changes due to the quality of their relationships. As indicated by the analyses with the ALT model, children's disclosure to their parents did not predict and was not predicted by the quality of their relationships with their parents. Although the quality of children's relationships with their parents transacted with children's withholding of information from their parents among adolescent girls in prior research using the auto-regressive model (Keijsers, Branje, Frijns, et al., 2010), future research needs to further examine the associations between the two by taking into account their shared trajectories over time.

Implications for Children's Academic Adjustment

The transactions identified in this research provide insight into the mechanism underlying the facilitating effects of children's sense of responsibility to their parents on their academic adjustment documented in prior research (Fuligni et al., 1999; Fuligni et al., 2002; Fuligni & Zhang, 2004; Hardway & Fuligni, 2006; Pomerantz et al., 2011). Longitudinal mediational analyses revealed the mediating role of children's disclosure: The more children felt obligated to parents, the more they subsequently disclosed to parents; children's disclosure, in turn, foreshadowed their subsequent heightened use of self-regulated learning strategies. Similarly, children's parent-oriented motivation in school predicted children's disclosure over time, which in turn predicted their enhanced learning strategies.

There was little evidence in the current research that children's sense of responsibility to their parents accounted for the effects of their disclosure to their parents on their academic adjustment. Analyses with the auto-regressive models showed that

children's heightened disclosure to their parents at Wave 1 predicted their enhanced parent-oriented motivation in school at Wave 2, which in turn predicted their self-regulated learning strategies at Wave 3. However, these indirect effect paths do not appear to be reliable, as they did not extend over time (i.e., from Wave 2 to 4). Additionally, these observed indirect effects disappeared after adjusting for the shared trajectories of children's disclosure and parent-oriented motivation. Thus, it seems that children's disclosure may have direct effects on their self-regulated learning strategies. The immediate help (e.g., suggestions and studying materials) children get from parents following their disclosure may be more proximally related to children's subsequent academic adjustment than their sense of responsibility to their parents.

The transactions identified in this research together with the mediating role of children's disclosure shed light on the differences in children's maintenance of academic adjustment over time in the United States and China. It has been documented that as children move through early adolescence, their self-regulated learning strategies decline in the United States, but remain stable in China (Wang & Pomerantz, 2009). Given that children's disclosure and sense of responsibility both declined over time during early adolescence in the United States (Cheung et al., in press; Pomerantz et al., 2011), it is possible that as the two shaped each other in a downward spiral, children's self-regulated learning strategies consequently declined over time. In China, in contrast, although children's disclosure also declined over time (Cheung et al., in press), their sense of responsibility remained stable or even increased (Pomerantz et al., 2011). Children's sense of responsibility and their disclosure to parents may transact with each other in a level spiral, leading to the maintenance of their learning strategies over time in China.

Methodological and Analytic Consideration

The current research has several strengths in terms of the methodology it used. First, following children four times over the course of two years as they made their way through early adolescence, it provided an optimal context for examining the proposed transactional and mediational relations, permitting a window into the direction of the effects. Second, the ALT model (e.g., Bollen & Curran, 2004, 2006; Bollen & Zimmer, 2010) which takes into account the associated changes among constructs was employed, thus more accurate estimations for the proposed relations were obtained. Given that the ALT model is relatively a new model which has not been used frequently in the field, I took a piecewise approach, moving the analyses from the traditional autoregressive model to the ALT model. Generally speaking, these two approaches generated similar findings. The major difference emerged in the associations among constructs from Wave 1 to Wave 2. For example, children's feelings of obligation and disclosure to parents predicted each other from Wave 1 to Wave 2 in the autoregressive model, but not in the ALT model. It was also evident only in the autoregressive model that disclosure at Wave 1 significantly predicted children's heightened parent-oriented motivation at Wave 2. This was possibly because Wave 1 to Wave 2 predictions were less reliable given that the first wave of data did not take stability into consideration (Bollen & Zimmer, 2010). Another possible reason for the lack of significant associations from Wave 1 to Wave 2 was that this study only has four waves of data which is the minimum required for running the ALT model. Future research may need to include more data collection points, which as Bollen and Curran (2004) suggested may improve the power of the ALT model, permitting a stronger detection of the transactional effects.

Limitations and Future Directions

There are several limitations of the current research that leave open questions for future work. First, following much prior research (e.g., Kerr & Stattin, 2000; Stattin & Kerr, 2000; Smetana et al., 2006; Soenens et al., 2006; Keijsers, Branje, VanderValk, et al., 2010; Laird & Marrero, 2010), this study relied on children's reports of their disclosure to parents. Given that my aim was to assess children's willingness and openness in sharing information about their life with parents, children may be the more accurate reporter than parents or observers. For example, parents may not know whether children have hid information from them about what they do during their free time. However, children served as reporters for all of the other constructs under study; thus, it might be argued that the associations documented simply reflect a reporter bias on the part of children. This issue was addressed to a large extent in both the transactional and mediational analyses by adjusting for children's earlier attributes when predicting them over time. However, research obtaining additional perspectives (e.g., parents) on children's disclosure and sense of responsibility via diverse methods (e.g., experiments and observations) would be fruitful.

Second, children's disclosure to their parents was measured across a host of everyday issues (e.g., what happens during free time, at school, and with friends). Given that the associations between children's disclosure and sense of responsibility to their parents may vary as a function of the domain of such issues, this study took a step to exclude the possibility that the transactions between the two were more evident for children's disclosure in the academic (vs. nonacademic) domains. Nevertheless, there may be other domains which may create variations in children's disclosure to parents and

its transactions with their sense of responsibility to their parents. Research conducted in a lower middle-class European American sample found that parents and children viewed children as more obligated to disclose about prudential issues and less obligated to disclose about personal issue than other issues (Smetana et al., 2006). Thus, it is possible that children's sense of responsibility may not carry with it the obligation to disclose in the personal domain. When children disclose issues that fall into the personal domain, parents may be less likely to take the opportunity to foster children's sense of responsibility to them. Research to date has not provided clear empirical evidence for the role of domain in the association between children's sense of responsibility and disclosure to their parents. Although one study found children's feelings of obligation to their family was associated with their disclosure across all domains for Chinese and European Americans (Yau et al., 2009), which suggests domain may not matter, the concurrent nature of the design prohibits a definite answer. Future research distinguishing children's disclosure to parents about everyday issues in multiple domains with a longitudinal design to detect the direction of effects would prove fruitful.

Third, the samples used in the current research do not represent the diversity of the United States and China, leaving open questions about variability within the two countries in the transactions between children's sense of responsibility and disclosure to parents as well as their role in children's academic adjustment. Indeed, in the United States children from different ethnic backgrounds differ in the extent to which they disclose to parents (e.g., Yau et al., 2009) as well as their sense of responsibility to parents as manifest in their feelings of obligation to them (e.g., Fuligni et al., 1999). Thus, I may have missed identifying important variations in the associations between

children's sense of responsibility and disclosure within the United States, given that the American sample was mainly of European descent. There may be differences within China as well. Given that urban areas in China, such as Beijing where the participants of this study were recruited, have been increasingly exposed to Western values in the past few decades, it is unclear to what extent findings of this research are generalizable to less urban areas in China, particularly in light of differences in how urban and rural children differ in their feelings of obligation to their family (Fuligni & Zhang, 2004). Future research on transactions between children's sense of responsibility and disclosure to parents needs to take these within-country variations into consideration.

Conclusions

The current research advances knowledge about children's disclosure to parents by identifying the facilitating role of their sense of responsibility to parents in its development during early adolescence in the United States and China. In both countries, children's sense of responsibility to parents foreshadowed their disclosure to them over time. Children's disclosure, in turn, predicted their heightened sense of responsibility to parents such that the two transacted over time, mutually maintaining one another as children progressed through early adolescence. Notably, these transactions were similarly evident in the United States and China. This research also revealed that one mechanism through which children's sense of responsibility to parents benefits their academic adjustment as manifest in their self-regulated learning strategies is by heightening their disclosure to parents. The transactions identified in this research as well as the mediating role of children's disclosure in the effects of their sense of responsibility to parents are of import for understanding children's maintenance of their academic adjustment over time.

Table 1

Means and Standard Deviations of the Variables

		United States				China			
		Wave 1	Wave 2	Wave 3	Wave 4	Wave 1	Wave 2	Wave 3	Wave 4
Feelings of Obligation	<i>M</i>	4.32	4.24	4.21	4.08	4.34	4.31	4.39	4.38
	(SD)	(0.57)	(0.71)	(0.71)	(0.80)	(0.56)	(0.61)	(0.59)	(0.61)
Parent-oriented Motivation	<i>M</i>	3.71	3.52	3.40	3.38	3.46	3.49	3.60	3.55
	(SD)	(0.90)	1.01	(0.99)	(0.96)	(0.87)	(0.92)	(0.85)	(0.88)
Disclosure to Parents	<i>M</i>	3.14	3.09	3.07	3.05	3.40	3.25	3.29	3.24
	(SD)	(0.88)	(0.90)	(0.86)	(0.86)	(0.83)	(0.89)	(0.87)	(0.84)
Relationship Quality	<i>M</i>	3.84	3.71	3.76	3.65	3.58	3.43	3.52	3.52
	(SD)	(0.80)	(0.84)	(0.84)	(0.82)	(0.74)	(0.79)	(0.72)	(0.76)
Self-regulated Learning Strategies	<i>M</i>	3.38	3.22	3.19	3.14	3.34	3.25	3.31	3.31
	(SD)	(0.81)	(0.85)	(0.88)	(0.88)	(0.69)	(0.83)	(0.77)	(0.77)

Table 2

Associations between Adolescents' Sense of Responsibility, Disclosure to Parents and Relationship Quality with Parents

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Feelings of Obligation																				
1. Wave 1		.50	.48	.34	.34	.32	.30	.15	.42	.40	.37	.32	.49	.39	.33	.35	.33	.27	.30	.28
2. Wave 2	.64		.54	.44	.21	.43	.39	.29	.31	.42	.35	.30	.35	.45	.41	.35	.30	.35	.38	.34
3. Wave 3	.51	.57		.52	.22	.27	.45	.31	.34	.36	.42	.39	.35	.32	.42	.36	.28	.26	.44	.34
4. Wave 4	.41	.41	.64		.19	.26	.29	.40	.31	.32	.32	.40	.30	.37	.38	.44	.25	.27	.32	.33
Parent-oriented Motivation																				
5. Wave 1	.21	.21	.13	.10		.57	.51	.40	.15	.11	.11	.13	.14	.15	.08	.10	.32	.23	.26	.19
6. Wave 2	.30	.40	.40	.30	.52		.58	.44	.18	.25	.23	.22	.18	.25	.19	.19	.30	.32	.37	.24
7. Wave 3	.24	.26	.46	.33	.41	.63		.55	.22	.23	.33	.28	.21	.24	.24	.21	.27	.30	.46	.34
8. Wave 4	.18	.19	.33	.49	.34	.54	.63		.17	.18	.27	.31	.15	.23	.23	.26	.17	.23	.38	.44
Disclosure to Parents																				
9. Wave 1	.53	.36	.36	.33	.03	.19	.15	.15		.73	.64	.61	.68	.57	.52	.49	.35	.35	.37	.34
10. Wave 2	.45	.46	.43	.34	.05	.29	.24	.17	.68		.73	.69	.56	.70	.60	.55	.34	.42	.45	.39
11. Wave 3	.43	.43	.49	.42	.06	.28	.32	.21	.66	.72		.76	.52	.57	.71	.61	.37	.39	.53	.47
12. Wave 4	.36	.33	.42	.56	.09	.26	.25	.35	.56	.60	.70		.49	.55	.64	.73	.32	.37	.46	.49
Relationship Quality																				
13. Wave 1	.62	.45	.43	.35	.04	.18	.09	.09	.66	.56	.54	.45		.70	.65	.63	.35	.35	.32	.33
14. Wave 2	.53	.54	.48	.37	.07	.22	.13	.08	.52	.64	.52	.44	.77		.72	.67	.34	.36	.36	.31
15. Wave 3	.44	.43	.59	.44	.06	.19	.20	.13	.44	.52	.59	.48	.69	.70		.76	.34	.33	.43	.39
16. Wave 4	.35	.35	.46	.57	.08	.13	.14	.20	.40	.46	.51	.67	.57	.64	.73		.32	.33	.36	.43
Self-regulated Learning																				
17. Wave 1	.47	.30	.35	.29	.26	.24	.27	.19	.47	.34	.35	.30	.40	.33	.25	.26		.58	.53	.46
18. Wave 2	.47	.39	.39	.31	.20	.37	.35	.28	.47	.42	.43	.37	.44	.39	.34	.30	.63		.62	.60
19. Wave 3	.36	.32	.49	.36	.17	.41	.50	.40	.37	.36	.46	.33	.31	.30	.35	.28	.57	.68		.68
20. Wave 4	.31	.31	.34	.46	.16	.37	.36	.48	.36	.36	.41	.44	.28	.29	.27	.38	.52	.60	.67	

Note. Correlations for the American sample are presented in the lower triangle; those for the Chinese sample are presented in the upper triangle. Correlations with values greater than .10 are significant at $p < .05$; those with values greater than .13 are significant at $p < .01$; those with values greater than .15 are significant at $p < .001$.

Table 3

Transactional Effects between Children's Sense of Responsibility and Disclosure to Parents: Auto-regressive Model

Cross-lagged paths	Wave 1 → Wave 2			Wave 2 → Wave 3			Wave 3 → Wave 4		
	B	SE	β	B	SE	β	B	SE	β
Obligation → Disclosure	.18	.05	.11***	.11	.04	.08**	.09	.04	.07**
Disclosure → Obligation	.07	.03	.09**	.10	.02	.14***	.09	.03	.11***
POM → Disclosure	.03	.03	.03	.06	.02	.06**	.03	.02	.04
Disclosure → POM	.17	.03	.16***	.10	.03	.10***	.06	.03	.05

Note. POM = Parent-oriented Motivation. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4

From the Bivariate Latent Growth Model to the ALT Model: Model Fit Indexes and Comparisons

		Indexes of model fit				Model comparison		
Model	df	χ^2	CFI	TLI	RMSEA	Models compared	Δ df	$\Delta\chi^2$
Feelings of obligation and disclosure								
Model 1: Bivariate latent growth model	22	118.50***	.97	.95	.07			
Model 2: Model 1 with stability added ^a	20	116.89***	.97	.95	.08	2 vs. 1	2	1.61
Model 3: Model 2 with within wave error correlation added	16	47.94***	.99	.98	.05	3 vs. 2	4	58.95***
Model 4: ATL model (Model 3 with cross-lag paths added)	10	9.09	1.00	1.00	.00	4 vs. 3	6	38.85***
Parent-oriented motivation and disclosure								
Model 1: Bivariate latent growth model	22	129.33***	.96	.94	.08			
Model 2: Model 1 with stability added ^a	20	127.49***	.96	.94	.08	2 vs. 1	2	1.84
Model 3: Model 2 with within wave error correlation added	16	67.05***	.98	.96	.06	3 vs. 2	4	60.44***
Model 4: ATL model (Model 3 with cross-lag paths added)	10	42.28***	.99	.96	.06	4 vs. 3	6	24.77***

Note. ^a Stability of feelings of obligation, parent-oriented motivation and disclosure were constrained to be equal over time in Model 2. *** $p < .001$.

Table 5

Transactional Effects between Children's Sense of Responsibility and Disclosure to Parents: ALT Model

Cross-lagged paths	Wave 1 → Wave 2			Wave 2 → Wave 3			Wave 3 → Wave 4		
	B	SE	β	B	SE	β	B	SE	β
Obligation → Disclosure	.02	.03	.01	.15	.05	.12***	.27	.07	.21***
Disclosure → Obligation	-.03	.03	-.03	.09	.04	.13*	.18	.07	.22**
POM → Disclosure	-.02	.02	-.02	.08	.03	.09*	.17	.05	.18**
Disclosure → POM	.03	.03	.03	.16	.06	.15**	.26	.09	.24**

Note. POM = Parent-oriented Motivation. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 6

Transactional Effects between Children's Sense of Responsibility, Disclosure to Parents and Relationship Quality

Cross-lagged paths	Auto-regressive Model			ALT Model		
	Wave 1→2	Wave 2→3	Wave 3→4	Wave 1→2	Wave 2→3	Wave 3→4
Disclosure and Relationship Quality						
Disclosure → RQ	.06*	.09**	.10***	.00	.07	.10
RQ → Disclosure	.14***	.04	.10***	-.06	.00	.05
Feelings of Obligation and Relationship Quality						
Obligation → RQ	.06*	.06*	.03	.00	.06	.07*
RQ → Obligation	.10**	.07*	.08*	-.06	.03	.10
Parent-oriented Motivation and Relationship Quality						
POM → RQ	.06*	.02	.02	-.01	.08*	.12*
RQ → POM	.11***	.02	.04	-.03	.08	.17*

Note. RQ = relationship quality. POM = parent-oriented motivation. Standardized estimates are shown in the table. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 7

Transactional Effects between Children's Sense of Responsibility and Disclosure to Parents in Academic vs. Non-academic Domains

Cross-lagged paths	Wave 1 → Wave 2			Wave 2 → Wave 3			Wave 3 → Wave 4		
	B	SE	β	B	SE	β	B	SE	β
Disclosure in the academic domain									
Obligation → Disclosure	.06	.03	.03	.18	.06	.12***	.27	.09	.18**
Disclosure → Obligation	-.01	.02	-.02	.08	.03	.12**	.14	.05	.20**
POM → Disclosure	.00	.03	.00	.10	.04	.09*	.15	.07	.13*
Disclosure → POM	.02	.03	.02	.12	.04	.13**	.20	.07	.22**
Disclosure in the non-academic domain									
Obligation → Disclosure	-.02	.03	-.01	.13	.05	.10*	.26	.08	.19***
Disclosure → Obligation	-.04	.03	-.05	.07	.04	.09	.14	.07	.17*
POM → Disclosure	-.04	.03	-.04	.09	.04	.09*	.19	.06	.20***
Disclosure → POM	.01	.03	.01	.13	.06	.13*	.23	.09	.21**

Note. POM = Parent-oriented motivation. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 8

Role of Sense of Responsibility and Disclosure in Self-regulated Learning Strategies: Total Effect

Paths	Wave 1 → Wave 3			Wave 2 → Wave 4		
	B	SE	β	B	SE	β
Obligation → Learning Strategies	.10	.04	.07*	.09	.03	.07**
Parent-oriented Motivation → Learning Strategies	.04	.03	.04	.02	.02	.02
Disclosure → Learning Strategies	.08	.03	.09***	.06	.03	.07*

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 9

Disclosure (or Sense of Responsibility) as a Mediator for the Effects of Children's Sense of Responsibility (or Disclosure) on their Self-regulated Learning Strategies: Auto-regressive Model

	From Wave 1 to Wave 3			From Wave 2 to Wave 4		
	a	b	c'	a	b	c'
Obligation → Disclosure → Learning Strategy						
Unstandardized Coefficient (SE)	.16 (.05)	.11 (.04)	-.02 (.05)	.10 (.04)	.13 (.04)	.08(.04)
Standardized Coefficient	.10***	.12**	-.02	.08**	.13**	.06*
Disclosure → Obligation → Learning Strategy						
Unstandardized Coefficient (SE)	.05 (.03)	.12 (.04)	.01 (.04)	.10 (.02)	-.03 (.04)	-.02 (.04)
Standardized Coefficient	.07*	.09**	.01	.14***	-.02	-.02
Parent Motivation → Disclosure → Learning Strategy						
Unstandardized Coefficient (SE)	.02 (.03)	.11 (.03)	-.04 (.03)	.05 (.02)	.12 (.04)	-.01 (.03)
Standardized Coefficient	.02	.12***	-.04	.06*	.13**	-.01
Disclosure → Parent Motivation → Learning Strategy						
Unstandardized Coefficient (SE)	.13 (.03)	.16 (.03)	.02 (.04)	.10 (.03)	.04 (.03)	.01 (.03)
Standardized Coefficient	.12***	.19***	.02	.10***	.04	.01

Note. All models took the general form illustrated in Figure 4. Paths from the source (e.g., obligation) to the mediator (e.g., disclosure) were labeled as “a”, with those from the mediator (e.g., disclosure) to the outcome (e.g., learning strategies) labeled as “b” and those from source (e.g., obligation) to the outcome (e.g., learning strategies) labeled as “c’”. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 10

Disclosure (or Sense of Responsibility) as a Mediator for the Effects of Children's Sense of Responsibility (or Disclosure) on their Self-regulated Learning Strategies: ALT Model

	a	b	c'
Obligation → Disclosure → Learning Strategy			
Unstandardized Coefficient (SE)	.12 (.03)	.09(.04)	.05 (.04)
Standardized Coefficient	.09***	.09**	.03
Disclosure → Obligation → Learning Strategy			
Unstandardized Coefficient (SE)	.08 (.03)	-.02 (.04)	-.12 (.04)
Standardized Coefficient	.11***	-.01	-.13**
Parent Motivation → Disclosure → Learning Strategy			
Unstandardized Coefficient (SE)	.07 (.02)	.12 (.04)	-.03 (.03)
Standardized Coefficient	.08***	.12***	-.03
Disclosure → Parent Motivation → Learning Strategy			
Unstandardized Coefficient (SE)	.09 (.03)	-.04 (.03)	-.05 (.04)
Standardized Coefficient	.09***	-.04	-.05

Note. All models took the general form illustrated in Figure 5. Paths from the source (e.g., obligation) to the mediator (e.g., disclosure) were labeled as “a”, with those from the mediator (e.g., disclosure) to the outcome (e.g., learning strategies) labeled as “b” and those from source (e.g., obligation) to the outcome (e.g., learning strategies) labeled as “c’”. * $p < .05$. ** $p < .01$. *** $p < .001$.

FIGURES

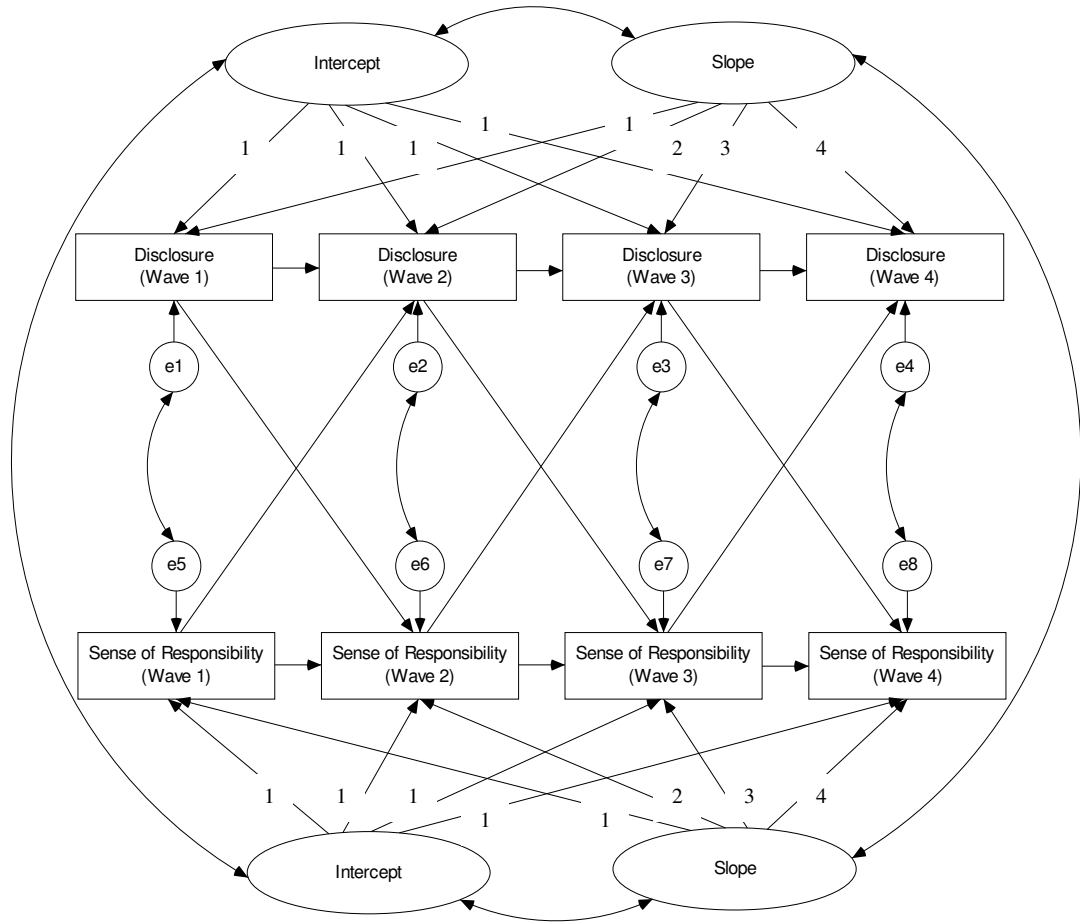


Figure 1. Schematic illustration of the Auto-regressive Latent Trajectory (ALT) model examining the transactions between children's sense of responsibility to parents and disclosure to them during early adolescence. *Note.* For ease of presentation, correlations between the intercept (slope) of sense of responsibility to parents and the slope (intercept) of disclosure to parents were included in the model, but are not shown here. The two forms of children's sense of responsibility to parents – children's feelings of obligation to parents and parent-oriented motivation in school – were examined in separate models. In each model, the auto-regressive paths for each construct were constrained to be equal over time.

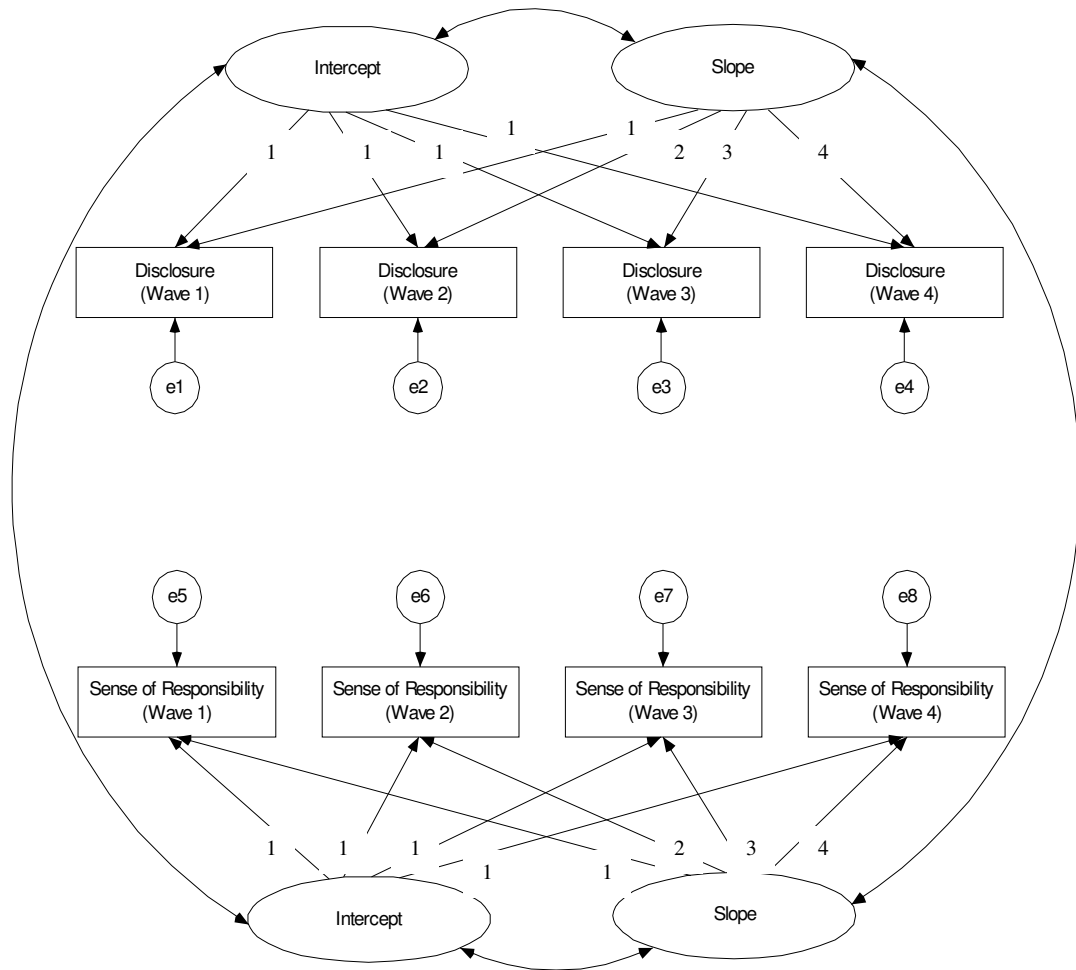


Figure 2. Schematic illustration of the bivariate latent trajectory model examining the associated changes between children’s sense of responsibility to their parents and disclosure to them during early adolescence. *Note.* For ease of presentation, correlations between the intercept (slope) of sense of responsibility to parents and the slope (intercept) of disclosure to parents were included in the model, but are not shown here. The two forms of children’s sense of responsibility to parents – children’s feelings of obligation to parents and parent-oriented motivation in school – were examined in separate models.

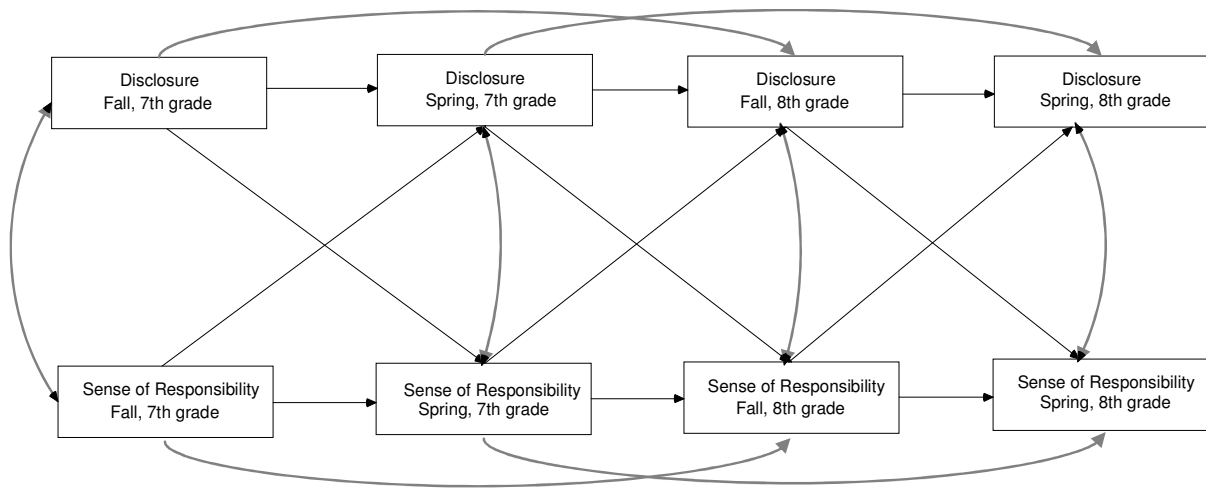


Figure 3. Schematic illustration of the auto-regressive model examining the transactions between children's sense of responsibility to their parents and disclosure to them during early adolescence. *Note.* Paths of one-year stability for each construct were added to the model to improve model fit. The two forms of children's sense of responsibility to their parents – children's feelings of obligation to their parents and parent-oriented motivation in school – were examined in separate models.

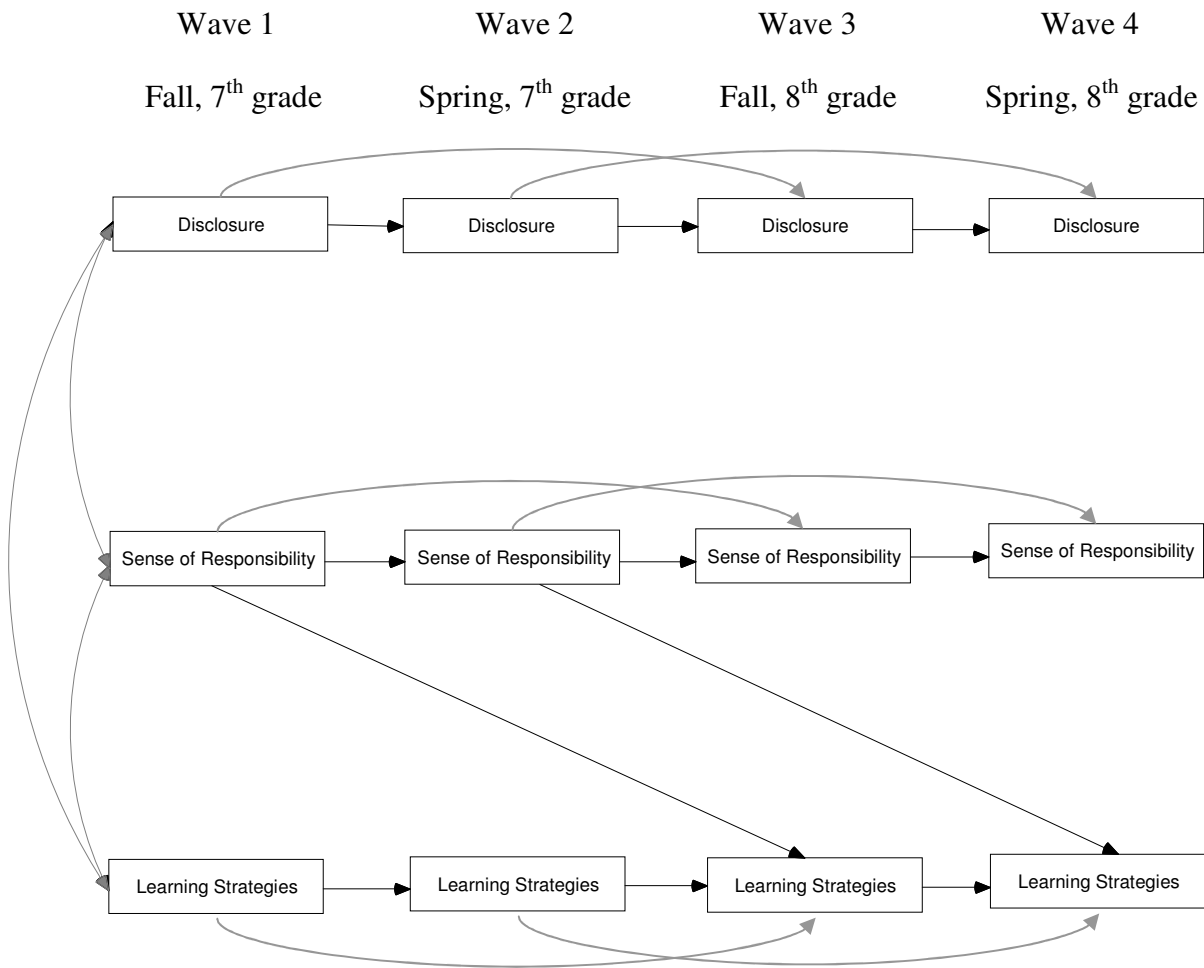


Figure 4. Schematic illustration of the mediation analyses with the auto-regressive model predicting children’s self-regulated learning strategies from the transactions between children’s sense of responsibility to their parents and disclosure to them from seventh to eighth grades. *Note.* Within-wave co-variances at Wave 2, 3, and 4 were included in the model but are not shown for ease of presentation. The two forms of children’s sense of responsibility to their parents were examined in separated models. To examine the total effect of children’s disclosure on their learning strategies, disclosure at Wave 1 and 2 were used to predict learning strategies at Wave 3 and 4.

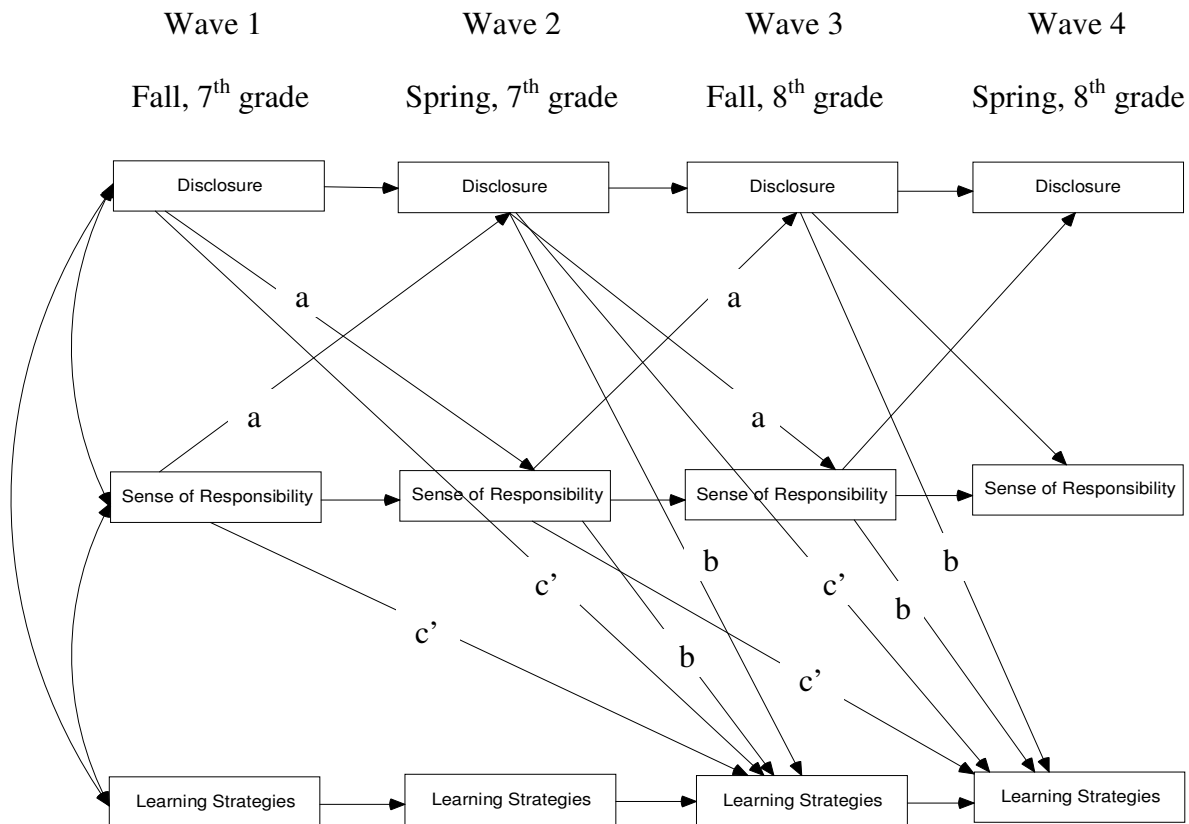


Figure 5. Schematic illustration of the mediation analyses with the auto-regressive model predicting children's self-regulated learning strategies from the transactions between their sense of responsibility to their parents and disclosure to them from the seventh to eighth grades. *Note.* The two forms of children's sense of responsibility to their parents were examined in separate models. Within-wave co-variances at Wave 2, 3, and 4 were included in the model but are not shown for ease of presentation; paths of the one-year stability for each construct were also included.

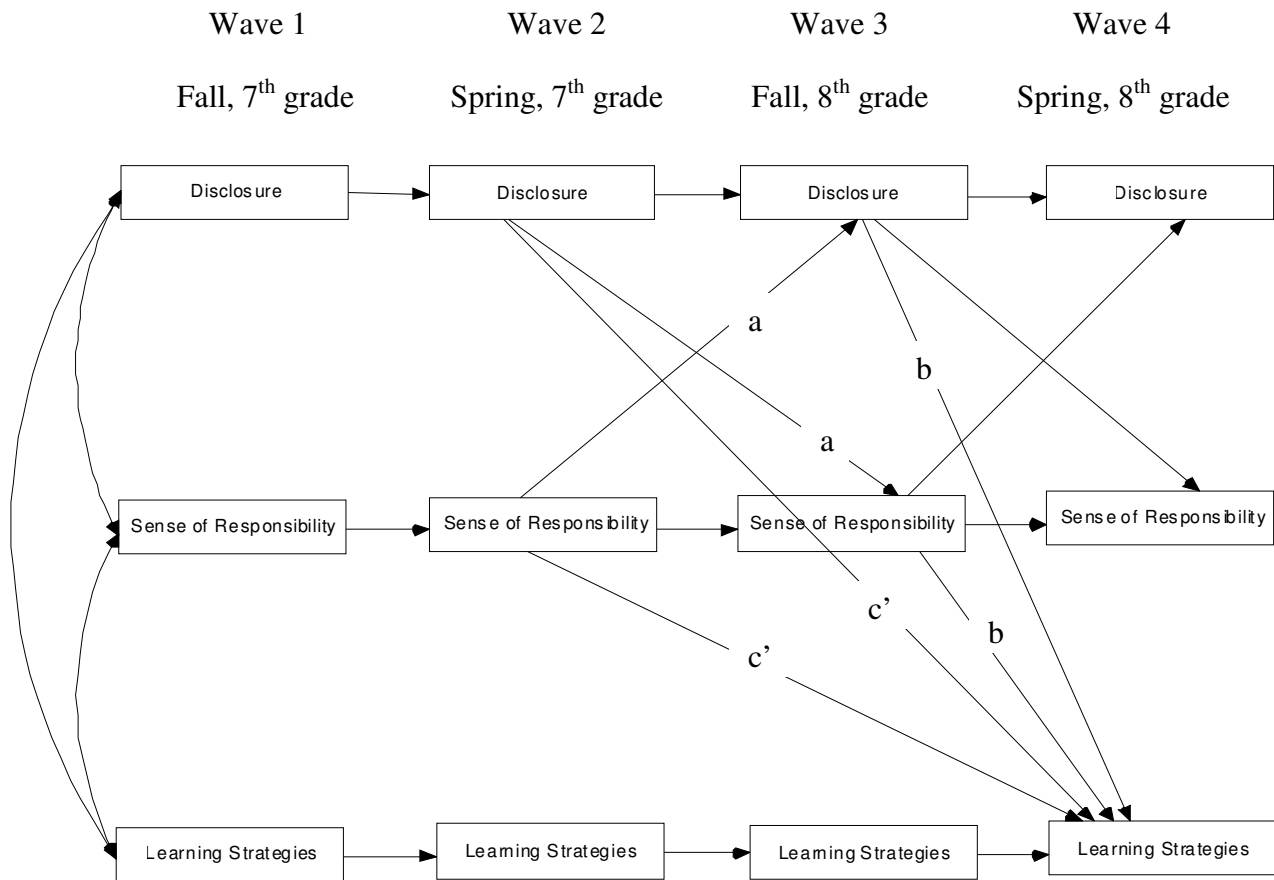


Figure 6. Schematic illustration of the mediation analyses with ALT model predicting children's self-regulated learning strategies from the transactions between children's sense of responsibility to their parents and disclosure to them from the seventh to eighth grades. *Note.* The two forms of children's sense of responsibility to their parents were examined in separate models. The intercept and slope factors of the three constructs (i.e., responsibility, disclosure, and learning strategies), the covariance among the intercept and slope factors, and the intercorrelations of the three constructs within Wave 2, 3 and 4 were included in the model, but omitted here for ease of presentation. The auto-regressive paths for each construct were constrained to be equal over time.

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APPENDIX A

Feelings of Obligation to Parents Measure

HOW MUCH DO YOU FEEL YOU SHOULD . . .

1. Spend time at home with your parents?
 2. Spend holidays with your parents?
 3. Help your parents with housework when they need it?
 4. Respect your parents?
 5. Obey your parents?
 6. Please your parents?
 7. Look after your parents?
 8. Help your parents financially when they get older?
 9. Stay in contact with your parents when they get older?
-

APPENDIX B

Motivation in School to Please Parents Measure

WHY DO I TRY TO DO WELL IN SCHOOL?

1. To show my parents that I am being responsible.
 2. To please my parents.
 3. Because I want my parents' approval.
 4. So that I can get praise from my parents.
 5. So that my parents like me.
 6. Because I want my parents to think I am a good kid.
 7. Because my parents expect it of me.
 8. So that my parents will be proud of me.
 9. So that I don't disappoint my parents.
 10. To meet my parents' expectations of me.
 11. Because it's my obligation to my parents.
 12. To let my parents know that I am a responsible kid.
-

APPENDIX C

Disclosure to Parents Measure

-
1. I often start conversations with my parents about what happens in school.
 2. I hide a lot from my parents about what I do at nights and on weekends.
 3. I usually tell my parents what happens during my free time without them asking me.
 4. Even if my parents do not ask me, I talk to them about my experiences with schoolwork.
 5. I like to tell my parents about the things I do with my friends.
 6. I keep a lot of secrets from my parents about what I do during my free time.
 7. I do not like to share with my parents how I am doing in school.
 8. I often start conversations with my parents about how I spend my money.
 9. I do not talk to my parents about my friends unless they ask me.
 10. If I came home late, I would explain to my parents where I went, who I was with, and what I did, without them asking me.
-

APPENDIX D

Relationship Quality Measure

1. My parents respect my feelings.
 2. I feel my parents do a good job as my parents.
 3. My parents accept me as I am.
 4. I like to get my parents' point of view on things I'm concerned about.
 5. I feel it's no use letting my feelings show around my parents.
 6. My parents can tell when I'm upset about something.
 7. Talking over my problems with my parents makes me feel ashamed or foolish.
 8. My parents expect too much from me.
 9. I get upset easily around my parents.
 10. I get upset a lot more than my parents know about.
 11. When we discuss things, my parents care about my point of view.
 12. My parents trust my judgment.
 13. I wish I had different parents.
 14. My parents help me to understand myself better.
 15. I tell my parents about my problems and troubles.
 16. I feel angry with my parents.
 17. I do **not** get much attention from my parents.
 18. I feel comfortable talking about my difficulties with my parents
 19. My parents understand me.
 20. When I am angry about something, my parents try to be understanding.
 21. I trust my parents.
 22. My parents do **not** understand what I'm going through these days.
 23. I can count on my parents when I need to get something off my chest.
 24. If my parents know something is bothering me, they ask me about it.
-

APPENDIX E

Self-Regulated Learning Measure

WHY DO I TRY TO DO WELL IN SCHOOL?

1. When learning things for school, I try to see how they fit together with things I already know.
2. When I want to learn things for school, I practice repeating them to myself.
3. I check to see if I understand the things I am trying to learn.
4. I often look through books to see how they are arranged before I start reading.
5. If I am having trouble learning something at school, I ask for help.
6. I try to understand how the things I learn in school fit together with each other.
7. When trying to learn things for school, I reread my notes.
8. I try to make sure that I understand what I am learning.
9. When trying to learn things for school I pick out the most important parts first.
10. When I don't understand something at school, I try to get someone to help me.
11. I try to understand how what I learn in school is related to other things I know.
12. I try to memorize things I want to learn for school.
13. I try to decide what parts of my schoolwork I don't understand.
14. I try to plan out my schoolwork as best I can.
15. If I get confused about something at school, I go back and try to figure it out.
16. I memorize the material I want to learn for school.
17. I try to see the similarities and differences between things I am learning for school and things I already know.
18. The way I learn things for school is by asking myself questions to see if I

understand the material.

19. Before trying to learn things for school, I like to figure out what the most important parts are.

20. If I get confused about something at school, I try to work it out later.

21. I try to match what I already know with things I am learning in school.

22. The way I learn things for school is to repeat them to myself.

23. When I am reading, I check to see if I understand what I have read.

24. I plan ahead so that I can do well in my schoolwork.

25. If I don't understand something in school, I go back and try to learn it again.

26. When learning things for school, I try to remember what I learned in other classes about the same or similar things.

27. I reread my books when I want to learn things for school.

28. I try to decide what parts of my schoolwork I don't know well.

29. Before starting my work, I try to decide what the most important parts are of what I must learn for school.

30. If I don't understand my schoolwork, I ask an adult to help me.
